Collective DC modelling

Prepared for the ABI

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Introduction

Background and scope

This paper was commissioned by the Association of British Insurers (ABI) to:

- Provide comments on several existing studies carried out by different parties into the potential benefits of Collective Defined Contribution (CDC) pension arrangements; and
- Set out the results of our own modelling comparing CDC pension outcomes to those that might be obtained by individuals accessing their Individual Defined Contribution (IDC) benefits.
- To set out areas that it will be important for insurers to consider carefully if they are contemplating a CDC offering.
- Provide some commentary on the experience to date with CDC arrangements in the Netherlands.

The authors ("**we**", "**us**") have prepared this paper to summarise the work undertaken and in particular the results of the modelling performed. The modelling work undertaken is illustrative and is not intended to reflect any current product offering.

We provide this paper in our capacity as external advisers to the ABI. This paper is not intended for any other purpose or to assist any other user in making decisions and we, MBWL International Ltd, Barnett Waddingham LLP and Milliman LLP accept no liability to third parties in respect of this paper.

We understand that the paper will be shared with the ABI's membership and may also be circulated more widely. However, we note the intended audience for this paper is assumed to have existing background knowledge of the pension arrangements discussed and be familiar with general investment concepts such as volatility and sequencing risk.

Regulatory and professional guidance

- This paper is subject to and complies with *Technical Actuarial Standard 100: General Actuarial Standards*.
- This paper has also been subject to independent peer review in line with Actuarial Profession Standard ("APS") X2, issued by the Institute and Faculty of Actuaries.

Structure of the paper

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Executive summary

Review of prior studies

We considered six prior studies which looked at how CDC and IDC benefits may compare. These were carried out at various times, with the earliest in 2009 and the most recent in 2020. These studies all showed that CDC schemes were likely to provide higher member benefits than IDC arrangements (generally of the order of 30% to 40% higher with one study going as high as 70%) although the assumptions used, the arrangement structures and the basis for comparison differed between them. The main driver for the CDC advantage was the ability of CDC schemes to invest in growth assets for longer than IDC arrangements.

Some of the studies pre-date the 2014 pension access reforms meaning drawdown options and other IDC innovations have not been considered in some studies and all of the studies were carried out before the revised CDC regulations were published by DWP in 2023. Similarly, all of the studies pre-date the market events in 2022 that led to significantly higher interest rates and short-term inflation and also pre-date the covid pandemic from 2020 that has impacted on life expectancies. Whilst we have no criticisms of the modelling carried out, it is clear that new up-to-date modelling is required in order to form a more up-to-date view on the comparison of likely CDC and IDC outcomes.

We have carried out some new modelling allowing for updated market conditions, the likely CDC structure required by the new regulations, the different asset strategies and returns achieved in CDC and IDC and various different decumulation options in the IDC arrangement. In order to calculate a comparison between an CDC income for life and the IDC decumulation options, we have used two metrics – average replacement ratio and the rate of return for the member, based on survival to a range of ages.

Contemporary modelling: whole-of-life

In order to provide the ABI with meaningful results to inform its CDC consultation response in the short time available, we have modelled outcomes deterministically, but used a stochastic model to produce economic scenarios that feed into the deterministic modelling. The results are therefore only reflective of the particular scenario that has been selected – arguably this is realistic for an individual member's outcome as they will experience a single volatile scenario in practice.

The economic scenario selected for the base case is chosen to reflect a "volatile broadly median" return scenario, which we have contrasted initially to a simplified linear scenario with broadly consistent long-term returns. We then show the sensitivity of the volatile scenario results to a "volatile low" return scenario and a "volatile high" return scenario, to illustrate the variability of the CDC and IDC outcomes allowing for some variation in economic scenarios. We have modelled CDC outcomes versus IDC outcomes for members joining the arrangements at ages 30, 40 and 50. Contribution levels and outcomes have been based on a single life rather than also incorporating contingent benefits.

A high level summary of our findings is:

- CDC frequently gives better member outcomes than IDC annuitisation, both in terms of average income replacement ratio and rate of return for the member, albeit at a much lower level than the previous studies indicated. The longer a member survives, the greater the differential as CDC's longer exposure to growth assets drives benefit increases.
- The drawdown comparison shows a different picture – the return of fund when a member dies means that member rates of return are often higher than for CDC when the member dies at younger ages.
- The modelling for the option where the member initially accesses their IDC fund via drawdown and then annuitises at age 80 shows very similar results to the pure drawdown scenario.

Executive summary (continued)

- This pattern holds for most observations across high, medium and low volatility scenarios.
- The above analysis is based on a mature, steady state CDC position. We have modelled outcomes based on a new CDC scheme building up scale – member outcomes are slightly lower than in the steady state (on the central asset scenario) as a result of higher expenses early on and greater exposure to risky assets during the build-up phase.
- The overall picture is quite complex and whether CDC or IDC delivers the better outcome varies with the investment scenario, how long the member lives, the exact nature of the products on offer and the metrics used for the comparison.

Contemporary modelling: decumulation only

The analysis shows that the difference in average replacement ratio between the various options is small unless the member survives to an old age, such as 90, when CDC performs much better, as in the whole-of-life scenario. The member's rate of return is much worse for CDC and IDC with annuitisation than for IDC and drawdown, as expected because of the loss of benefit after death and the refund of the remaining pot in the drawdown scenario.

The pattern is the same across high, medium and low volatility scenarios with some more pronounced movements in the high age of survival cases. The results for the new decumulation only CDC scheme are similar but just slightly lower than for the established stable scheme.

How insurers can offer CDC

Insurers are well placed to offer CDC, with insurers being capable of providing both trust-based and contract-based schemes. This experience and knowledge extends beyond the accumulation stage of DC pensions. Insurers have been delivering decumulation products and solutions to both the corporate and individual markets for many years, and one may argue that retirement income sits more naturally with insurers than with a (then-former) employer.

Insurers have the following key advantages for offering CDC:

- Having offered similar products, insurers should have the existing capabilities in terms of modelling/administration systems, governance structures and in-house expertise to design, launch and run CDC without starting from scratch.
- Giving up retirement savings to a company, particularly where the consumer retains the risk while having no say in the running of those funds (other than selection of company to invest with) will require a great deal of consumer trust. Many insurers are household names and have a proven track record for managing customers finances securely.
- Insurers have scale in their existing book to sell decumulation products and services (as they do already), but they also have a distribution advantage in their network of supporting IFAs serviced by a sales force and relationship managers. This also further extends with those who have direct client bases.

However, there are also risks facing insurers in offering CDC that would need to be considered carefully:

- Insurers may find it challenging to achieve the required/desired scale for Value for Money in a CDC Scheme, relative to e.g. a single employer offering a scheme to all employees. Insurers would be dependent on an attractive CDC Scheme design relative to other retirement products available in the market, and so design and marketing would be key to success. Care would need to be taken to ensure any CDC product is marketed appropriately to avoid overpromising/mis-selling.

Executive summary (continued)

- A CDC product may be at odds with what consumers have come to expect with recent trends and pension freedoms, e.g. no ready access to current value, no responsibility for financial decisions while retaining the risk, lack of transparency given discretionary elements, etc.
- The overall insurer cost base compared with that of Master Trusts (e.g. additional costs for marketing/financial promotion, Consumer Duty if contract-based, etc.) may make a "level playing field" more challenging in relation to both start up and ongoing costs.
- As has been seen in the Netherland, CDC can present actual or perceived issues with cross-subsidies and transparency. However, the pooling of risks is one of the key features of the product (and a source of additional returns). There is also potential for reputational damage and additional costs of restructure if initial/existing CDC proposals were deemed to be not working properly.
- Regulatory views on CDC are as yet unclear, and these could facilitate or hinder insurers entering this market.

CDC in the Netherlands

Dutch CDC plans originated from a desire to remove pension-related corporate balance sheet risks rather than out of a desire to pool assets to increase expected investment revenues. Defined benefit plans were converted to CDC with a passing of all risks to the members. As a result, Dutch CDC plans were set up differently to how we would expect UK CDC funds to operate, in particular a more prudent investment policy with lower expected return on assets.

Some of the issues faced by Dutch CDC plans may also be faced by UK plans, such as:

- Determination of a risk profile of the fund that fits with the risk profile of participants, e.g., by using questionnaires. Different profiles may apply for different age categories, as well as for participants in the accumulation phase and participants in the pay-out phase. UK schemes should make sure that for each phase, the risk preferences of the collective participants and resulting asset pooling is clear and that the investment policy is (and remains) in line with these preferences.
- By continued pooling of assets in the CDC plans, corporates could maintain the benefits of such pooling and avoid the possible negative effects of IDC plan investments where participants can be exposed to the full effects of investment market volatility and in response possibly adopt a more conservative investment strategy with lower expected returns overall.
- In order to manage the expectations of participants and comply with the duty of care of the administrator in relation to the risk profile of the fund it's essential to make sure that the result of the asset pooling is translated in clear allocation guidelines and properly communicated with the involved participants.
- Communication with the participants about (incomplete) accrual, (incomplete) indexation of benefits or even benefit cuts is crucial. UK schemes should make sure participants are aware of the risks and the expected results under "bad weather", "good weather" and baseline.

Historical back-testing

We have back-tested the model by assuming that investment returns for the next 50 years will be the same as those experienced between 1973 and 2023. This does not make any allowance for mortality improvements above those assumed in our base scenario, so only reflects the impact of this particular investment scenario.

This shows that CDC would have underperformed IDC regardless of age of survival.

Review of prior studies

Modelling considered

Our comments are based on a review of the following papers:

Who	Year	Name of Study	Link to Study
Government Actuary's Department	2009	Modelling Collective Defined Contribution Schemes	https://webarchive.nationalarchives.gov.uk/ukgwa/20100612090708/http:/www.dwp.gov.uk/docs/modelling-collective-defined-contribution-schemes-dec09.pdf
The RSA	2012	Collective Pensions in the UK	https://www.thersa.org/globalassets/pdfs/reports/collective-pensions-in-the-uk.pdf
Aon	2013	The Case for Collective DC	https://www.aon.com/unitedkingdom/retirement-investment/defined-contribution/collective-defined-contribution/whitepaper-the-case-for-collective-dc
Pensions Policy Institute	2015	Modelling Collective Defined Contribution Schemes	https://www.pensionspolicyinstitute.org.uk/media/1797/20151105-modelling-cdc-schemes.pdf
Pensions Institute	2016	We Need a National Narrative: Building a Consensus around Retirement Income	http://www.pensions-institute.org/IRRIReport.pdf
WTW	2020	CDC - a new type of pension provision coming to the UK	https://www.wtwco.com/en-gb/insights/2020/09/collective-defined-contribution-a-new-type-of-pension-provision-coming-to-the-uk https://www.askaboutmoney.com/attachments/how-cdc-pension-levels-compare-with-other-types-of-schemes-pdf.5296/

Key observations from selected prior studies

The prior studies considered show a range of results comparing potential CDC benefits with those that could be achieved using an IDC product.

In general, the conclusion of all the studies considered is that CDC can provide better outcomes for members in the form of higher levels of expected pension income, with less variability compared with IDC.

Nevertheless, most of the studies pre-date UK legislation on CDC and the regulatory framework that has been put around it and some were also prepared before the "Freedom & Choice" pension reforms of 2015. They also pre-date the significant changes in the wider economic environment seen recently, with the sharp rise in inflation and interest rates, to levels that were likely unexpected during previous studies. To be clear, this is not a criticism of the prior work but simply a reflection of the reality that the pensions market has evolved and significant economic changes can happen. In particular, these inflation and interest rate changes have resulted in a radically different starting point for any future scenario projection, and so are worth investigating.

The key results comparing CDC and IDC in the prior studies are as follows:

- **GAD** – CDC is expected to produce a pension "pot" around 25% higher than conventional DC, which could deliver a retirement income over an individual's lifetime that is 39% higher than the corresponding IDC outcome. CDC income is also more predictable, with a standard deviation 18% lower for someone aged 30 at entry and 40% lower for someone aged 50 at entry.
- **RSA** – CDC is expected to provide a 37% higher income than IDC, through a combination of lower costs, no annuitisation and a less conservative investment strategy in the run-up to retirement.
- **Aon** – CDC is expected to provide at least a 38% higher income than IDC. (This is our calculation based on a CDC income replacement rate of 33% compared with IDC which gives between 12% and 24% depending on investment strategy pre-annuitisation.) Cuts to core benefits under CDC are expected to apply in just 5% of years going forward.
- **PPI** – A mature, stable CDC arrangement is expected to provide at least a 38% higher income than IDC. (This is our calculation based on a CDC replacement rate of 29%, compared to IDC which gives between 12% and 21% depending on how benefits are accessed.) CDC also gives a narrower range of outcomes.
- **Pensions Institute** – CDC pensions can be ~30% higher than IDC due to investment strategy differences (aggregating the results of models referenced). Smoothing of returns across generations is a trade-off against potential higher returns for some generations.
- **WTW** – CDC pensions are expected to be 70% higher than from IDC annuities.

We note these results are not necessarily directly comparable with each other given the various modelling methodologies used, assumptions made and the basis for comparison with IDC.

The modelling also highlights the three main areas through which CDC arrangements can theoretically provide better outcomes:

- Assumed ability to maintain exposure to growth assets for longer thereby improving expected investment returns under CDC.
- Avoiding margins in the pricing of annuities e.g., to cover an insurer's cost of capital in providing the guaranteed benefits.
- Ability to pool and smooth investment and longevity experience.

In the following pages, we consider changes in a number of areas in order to move a CDC to IDC comparison to a contemporary setting.

CDC and IDC - basis for comparing results

Fundamentally it is difficult to compare a CDC benefit to an IDC benefit, particularly following the 'Freedom & Choice' reforms to pension options since 2015. The result is that it is not always easy to understand the detail of how a particular "uplift", or a percentage based "better outcome" has been determined.

Pension income (level)
Where the basis for comparison is well defined, this is usually based on a replacement ratio, which is compared between CDC and IDC outcomes, for example:

- Aon notes that their replacement rate considers ***average income during retirement*** compared with salary prior to retirement.

Given the potential flexibility offered by income drawdown alongside the risk that funds may be exhausted, and the variable increases determined by scheme experience under CDC, an approach considering the average income over the period of retirement seems a good starting point in the comparison of outcomes.

The prior studies, some purely due to their age, have tended to focus on annuity purchase immediately at retirement as the pension income approach for IDC. The range of decumulation options considered can now be usefully expanded to reflect current market practices.

Only the PPI has looked at the impact on outcomes of starting a CDC scheme from scratch, as well as outcomes assuming a "steady-state" system. There will clearly be different challenges and risks to CDC schemes, and providers, in the build-up stage compared to steady-state.

Similarly, the existing modelling focuses on whole-life arrangements. There will be key differences in a decumulation-only environment (e.g., around pricing and membership profile) and these will need to be considered as part of the development of these vehicles.

Pension income (variability)
The expected level of pension income is clearly important but retirees will also be concerned with the extent to which their income may vary during retirement, particularly in real (inflation-adjusted) terms. GAD, Aon and the PPI have carried out stochastic analysis of CDC outcomes across a large number of economic scenarios to determine how pension income might change over the course of retirement. This is helpful to show a probabilistic distribution of outcomes, including some commentary on the potential for benefits to be cut back– rather than a single/central point estimate, which doesn't tell us about the potential variability of outcome.

Death benefits
In addition to pension income, we also need to consider any benefits payable on death for example, a residual lump sum payable to the estate whilst in income drawdown. One approach to allow for this is by considering adding metrics such as an internal rate of return that allows for both income and death benefits. With the increased use of income drawdown, we feel this is a useful complement to metrics such as average income during retirement.

CDC and IDC - product design

CDC

Most of the modelling in the 6 papers reviewed pre-dates UK legislation and regulation around CDC schemes, which was largely built around the expected Royal Mail scheme design. This means there are some elements of this modelling that do not necessarily fit into the new regime.

In particular, the GAD modelling assumed a complex process of annuity purchases to secure the initial level of CDC benefit for pensioners and then subsequently secure any increases due. Whilst this represents a possible opportunity for insurers, there would be significant challenges in putting this approach into practice (e.g., around timing) and, crucially, it would not allow for the core CDC benefit to decrease after retirement. This would not be feasible for a CDC scheme under the current regime. Generally, the modelled CDC arrangements target inflation-linked increases, which is in line with the proposed regime (under consultation) to extend CDC schemes to the wider population. The pension increase will then be varied to take into account the funding position of the CDC scheme each year.

Although CDC valuations will be required to be carried out on a best estimate basis, i.e.,. there is effectively no reserve to cover adverse future experience, we expect there to be an element of smoothing. Existing modelling caters for this by incorporating "funding gates", where target pension increases are paid if the funding position at the annual valuation lies within these gates, and only varied if the funding position moves outside of them. There are, however, differences in what future increases are projected when actual increases in a particular year are above or below the target.

This is slightly different to the Royal Mail arrangement, where increases are granted at a level where the scheme can afford to pay increases at that level going forward (relative to inflation). However, this still incorporates an element of smoothing by considering what will be paid in future.

The CDC market in the UK remains at its very early stages and, if the market takes off, there will undoubtedly be a range of different structures used by different arrangements. In our view it would make most sense at the current time to model an arrangement with an increase/reduction mechanism that looks broadly like the Royal Mail arrangement (as the only currently operating scheme).

IDC

Modelling of IDC in all the studies considered is heavily focused on the use of an annuity as the decumulation vehicle (only the PPI study modelled income drawdown). However, in a contemporary setting, we expect many retirees to use income drawdown or some combination of annuity and drawdown to access IDC pension benefits. This has some implications for the comparison with CDC:

- The use of drawdown in decumulation reduces or defers the need to undertake significant de-risking of the IDC investment strategy and so offers scope to maintain exposure to growth assets.
- Income drawdown solutions also change the extent and timing of the guarantees provided around pension income under IDC. An annuity guarantees an income for the member for life, though this comes at a cost driven by:
  - The expected lower return on fixed income assets backing an annuity vs. the ability for a retiree to retain some continued exposure to growth assets in CDC; and
  - The profit margin, cost of capital and expenses of the insurer (though we note a CDC scheme will also incur costs in paying out incomes).

  Both of these are likely to vary over time given economic conditions, and the latter will also depend upon prevailing regulation. For example, recent reforms proposed to UK Solvency II, significantly reducing the Risk Margin[1], are expected to reduce capital costs for annuities.

[1]See: https://www.gov.uk/government/publications/draft-insurance-and-reinsurance-undertakings-prudential-requirements-regulations

CDC and IDC - investment strategy and approach

GAD	The RSA	Aon	PPI	Pensions Institute	WTW
CDC: 100% equities pre-retirement **IDC:** Pre-Life styling: Equity 100% Post 5-year glide path: Bonds and cash (no split mentioned)	**CDC:** flat returns of 6% p.a. **IDC:** returns of 6% p.a. up to 5 years before retirement, then 5% pa to retirement	**CDC:** 60% equities, 40% bonds **IDC:** 100% equities, life-styling to 100% gilts over the 10 years to retirement	**CDC:** 60% equities, 40% bonds **IDC:** 100% equities, life-styling to 40% equities and 60% bonds over undefined period to retirement (and retained during drawdown)	**IDC:** High Growth: 60% Equities 40% Bonds 10-year glide path to 75% bonds 25% cash	*Return seeking assets:* Gilts plus 3.85% pa *Credit:* Gilts plus 0.6% pa *Low risk assets:* Gilts **CDC:** 100% in return seeking assets until age 67, reducing linearly to 100% in low-risk assets at age 90 **IDC:** 100% in return seeking assets until age 57, reducing linearly to 50% credit, 50% gilts between age 57 and 67

The table above summarises the approaches to investment strategy and returns in the studies considered. Investment strategy has the potential to lead to significant differences between CDC and IDC outcomes. The prior studies take different approaches to this, as is evident from the table, with some aligning the investment strategies closely while in other cases they are quite different.

In practice, we would expect the investment strategies for these products to be different. For example, a CDC arrangement is likely to take a long-term view with a (relatively) stable investment strategy over time. In IDC, the investment profile is likely to reflect a member's age (e.g., via target date funds) with a high allocation to growth assets until their 50s followed by a gradual de-risking of investments as retirement approaches.

We note the sophistication of the investment mix used also varies markedly from the simplified, 2 asset equity / bond mix adopted for modelling by Aon and the PPI to the more sophisticated asset mix contemplated in the WTW study where the growth assets are modelled as a combination of global equity, private markets, diversified growth assets and credit. Our expectation is that the actual investment strategy of a CDC scheme will be more diverse, along the lines of the WTW study. The approach taken will alter the return profile to some extent e.g., WTW note that their growth portfolio would return slightly less than a 100% allocation to global equities. However, this portfolio would presumably exhibit less volatility.

Regarding investment returns, there is relatively little detail provided in the modelling carried out by GAD, Aon and the PPI (which have stochastically modelled return scenarios). Aon has stated that they generated economic scenarios using their Global Capital Market Assumptions modelling based on conditions at 30 September 2012. Although volatility will always be present in the capital markets, and has been explored to some extent in the previous studies. Significant changes in the wider economic environment have been seen recently, with the sharp rise in inflation and interest rates to levels that were likely unexpected during previous studies. In particular, these inflation and interest rate changes have resulted in a radically different starting point for any future scenario projection, and so are worth investigating.

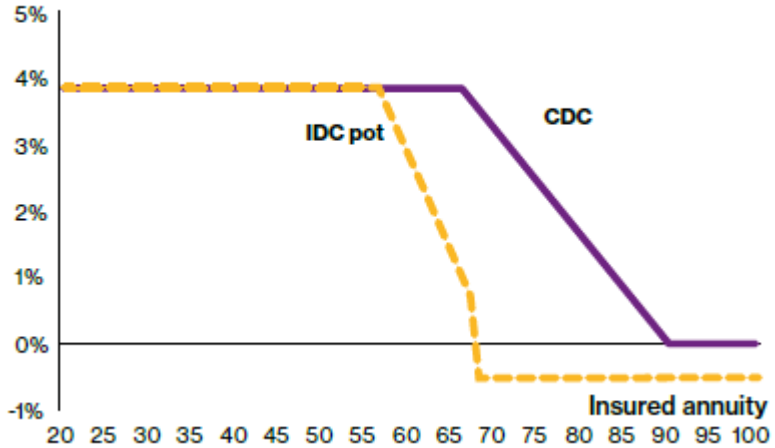
CDC and IDC - investment strategy and approach

Life-styling

As noted above, a key driver for the difference in outcomes between CDC and IDC in some of the prior studies is the lower returns generated by de-risking via a life-styling period in the run up to retirement.

This is illustrated nicely in the WTW modelling, which considers the investment returns that might be experienced in respect of an individual member in a CDC arrangement, in line with the theoretical glide path used in the Royal Mail investment structure. On the IDC side, the WTW analysis assumes earlier de-risking followed by full annuitisation at retirement with the difference in expected investment returns, versus the CDC case, clearly illustrated in the chart reproduced below.

Figure 1: **Comparison of returns under CDC with an IDC annuity**



Source:

Analysis: How CDC pension levels compare with other types of schemes

Willis Towers Watson

September 2020

Following Freedom & Choice and the wider adoption of income drawdown strategies for decumulation, it is now less clear that there is a rationale for an IDC pot to de-risk to the extent that was typical previously when there was a clear expectation of immediate annuity purchase at retirement.

Currently, we would expect members to remain invested in a certain proportion of growth assets whilst in a post-retirement income drawdown phase, although this is likely to be a more defensive portfolio both relative to pre-retirement IDC and a long-term asset allocation for CDC. In data sources that have been reviewed (noted in Appendix 3), there is a range of asset allocations at-retirement between different schemes. These would be dependent on the particular retirement choices made available. However, there were a number of schemes with some extent of growth assets and a comparatively balanced asset mix. This is also consistent with assumptions that we have seen used in the industry for design of income drawdown products.

We would also expect the portfolio to become more defensive over time, particularly if there is an aim to annuitise at a later age to protect against longevity risk. Returning to the chart, we note these changes would move the expected IDC returns (yellow line) closer to those of CDC (purple line).

CDC and IDC - expenses

Expenses

Expenses are an element that is often talked about qualitatively but not explicitly modelled. In part this is likely to be because the ongoing costs of a CDC arrangement are not yet known, and in practice it may well be that there isn't a consistent difference between CDC and IDC in this regard.

Where expenses are mentioned as a point of difference, the IDC expenses are considered to be higher than for CDC. The likely rationale for this is that the CDC costs being spread across more members so achieving lower cost per member from economies of scale. This contributes to the overall uplift in net investment return for an individual. For example, we note the RSA paper allowed for higher expenses in the IDC arrangement compared with the CDC arrangement (0.6% pa compared to 0.3% pa) based on evidence that CDC schemes in the Netherlands operated at a significant discount to IDC products.

In the UK, there are many low-cost IDC products available, in part due to the auto-enrolment charge-cap and in also due to competition in the marketplace. As noted above, the costs of a CDC arrangement are not yet known, but it is by no means certain that they will be lower as the following need to be considered:

- The requirement for an annual valuation and appropriate mechanism to adjust benefits – this will incur costs more akin to those borne by defined benefit schemes for actuarial support, albeit with annual valuations rather than triennial valuations;
- More focus on communications, which will be more challenging – CDC schemes have the added communication complexities of ensuring members understand that pensions may go down as well as up, with even more communication required in a year where benefit cuts or reduced pension increases occur, both of which are likely to lead to higher costs; and
- A more stringent regulatory environment – as it stands the proposed regime for extending CDC pension schemes to the wider population would be largely based on the existing framework for DC Master Trusts, but with extra requirements to allow for the additional complexity of CDC. This could be further the case in an insurance framework, and we comment separately on this later in the paper.

On the other hand, a CDC scheme would have the benefit of scale and so may be able to operate a more sophisticated investment strategy at a lower cost to an IDC product invested in a similar way.

On balance, we believe that assuming differences in costs between CDC and IDC is difficult to justify at present.

CDC and IDC - other factors

Historical analysis

Aon has modelled the behaviour of its illustrative CDC plan compared to IDC outcomes based on historical returns since 1930, which shows that there would only have been benefit cutbacks in three of those years. Whilst past performance is not necessarily a good guide for future performance, this does seem broadly in keeping with the future projection results. It also illustrates that the arrangement could deal with the market shocks seen in 2000 and 2008.

We note that an additional aspect that would be interesting to consider in this analysis is the impact of life expectancy changes over time, as these are effectively based on the assumption used for the future modelling, which was in line with the latest standard pension scheme mortality tables available at the time.

In practice life expectancy increased significantly during that historical period; data from the Office for National Statistics shows that cohort life expectancy improved by between 10% and 15% between 1950 and 2020. Had a CDC arrangement been established in the 1950s this could have had a significant impact on the initial design and would likely have led to lower increases over time, and could also have translated into more regular benefit reductions. Although it would depend on the benefits being offered, very broadly an increase in life expectancies at that level would mean contribution rates would need to increase by around 2% of salary to fund the accrual of target benefits.

CDC arrangements will be self-balancing to a certain extent, i.e., if the actual cost of accrual increases this will be picked up by a lower funding level at the next valuation, but the potential for extreme changes over a longer period begs the question of if and how more fundamental changes will be made (e.g., reducing accrual rates or increasing contributions for future service).

Demographics

The demographics of CDC schemes will be a key feature in how they operate. Whilst a lot of focus in some of the prior studies is on different investment approaches and how these will lead to different outcomes, a fundamental difference between CDC and IDC is mortality pooling.

The Aon and PPI studies do take this into account, but only allowing for new joiners at age 40 is limiting. In practice, there is likely to be an element of cross-subsidy in the accumulation phase, particularly where there is a fixed contribution rate – i.e., the cost of accrual is higher for older members but benefits are not reduced because of the surplus contributions from younger members.

Existing modelling also uses the same mortality assumption across the whole population. In practice, we would expect higher earners to live longer than lower earners, so in a whole-life arrangement there is again likely to be some cross-subsidy between these groups – i.e., lower earners are subsidising the outcomes for higher earners. In a decumulation-only context this presents a significant selection risk, e.g., it is possible that a decumulation-only CDC arrangement would be made up of individuals with higher-than-average life expectancy. This would limit the impact of longevity pooling compared to whole-life arrangements and has implications for how such a decumulation-only arrangement should be priced.

Death benefits

It is typical in a DB world for members to be eligible for a spouse or dependant's pension upon their death. In an IDC world, individuals can either choose to purchase an annuity which includes a spouse pension or rely on surplus drawdown funds being available.

Many of the CDC models assume a dependant's pension on death, typically 50%, but the PPI has not included this. In practice there is an open question around whether CDC arrangements will offer a spouse pension as standard.

It is unlikely that inclusion of a spouse pension will make a significant difference to the modelling results in terms of the comparison between CDC and IDC. Including a spouse pension for a CDC arrangement would mean the contribution rate would need to be higher to provide that benefit. There would therefore be a corresponding increase in the comparator IDC benefits to reflect the higher contributions being paid. (This would similarly apply in a decumulation-only context.)

Under CDC, outcomes in terms of actual pension increases given may be smoother if a spouse pension is provided as the pooled mortality experience will consider the experience of both lives rather than just the original member, potentially doubling the size of the pool of lives and therefore reducing the likelihood of random fluctuations. However, this is unlikely to affect a median outcome.

The impact on individuals, however, has the potential to be significant in extreme cases (e.g., where a member dies early in their retirement but their spouse lives much longer).

Summary (1)

Below is a summary of the areas where we feel it would be worthwhile to make some changes to update a CDC to IDC comparison to a contemporary setting:

Basis for comparison

- Extending the metrics used to consider both the level of income available from the modelled CDC and IDC arrangements alongside an indication of the variability in that income in relation to an appropriate benchmark which allows for the impact of inflation during retirement.
- Consider the experience of members at different ages during retirement as their view on risk and return may change. For example, at advanced ages, the appetite of members for significant variation in their real income (in relation to inflation) may be more limited than during the early stages of retirement. An inflation-linked annuity can offer zero variation in real income while both CDC and income drawdown will exhibit continued volatility.
- Include a metric such as internal rate of return that can capture the value of all benefits that flow to members (death benefits as well as income).

Product design

- CDC – we believe it makes sense to frame up to date CDC modelling around the proposed Royal Mail structure as the majority of the existing regulatory framework is built around this scheme design. There are certain elements of the prior studies which are different (e.g., the use of funding gates) and will need to be changed in our modelling.
- IDC – we feel the key change needed is to reflect the much greater prominence now afforded to income drawdown as part of an IDC decumulation solution and in particular modern approaches that blend the flexibility of income drawdown with the certainty offered by an annuity.

Summary (2)

Investment strategy and returns

- CDC strategy – the relatively simple approaches taken in many cases to model the investment strategy in a CDC arrangement can usefully be extended to reflect the more sophisticated strategies that the majority of large pension schemes now use. We would expect a CDC scheme at scale to have access to a wide range of investments which might offer higher returns for a given level of risk and feel that this should be reflected more in the modelling.
- IDC strategy – the comment above about the breadth of investments also applies here. In addition, changes in product design as the inclusion of income drawdown offers the opportunity for members to retain a meaningful exposure to growth assets for longer as the need to significantly de-risk into cash and bonds can be reduced and/or deferred.
- Returns - we plan to take a different line to some of the prior studies and reflect what we expect in practice to be likely differences in the investment strategies and returns between CDC and IDC arrangements.

Other considerations

- The level of expenses is largely unknown due to the limited information on typical CDC expenses, so it is difficult to justify a difference in expense assumptions between IDC and CDC. We will therefore use the same expense assumptions under both schemes.
- There is a lot of commentary on investment strategy in the existing papers, but relatively little on longevity. One of the key aspects of CDC is the longevity pooling that it provides, but this doesn't mean that outcomes are not affected by changes in life expectancy. If members begin living much longer than expected, then over time this would become a drag on the increases a CDC arrangement is able to offer. This is perhaps unlikely to lead to one-off benefit reductions in the same way as, for example, an equity market shock, but there may come a point where the contributions being paid are just not sufficient to fund the target benefits (i.e., the contribution rate being paid would not support the level of target accrual), at which point the overall design of the scheme may need to be revisited.

In the next section we set out the results of our modelling and the assumptions we have made to produce them.

Contemporary modelling: whole-of-life

Base case – design

Our base case scenario is designed to reflect a medium outcome, allowing for some reasonable volatility in economic conditions. Some high-level comments on the CDC and IDC arrangements considered are set out below. For further detail please refer to the Appendices which include fuller explanations of the example arrangements and our modelling approach.

CDC scheme

The CDC scheme we have modelled targets a pension accruing at 1/100th of salary in each year which will increase before and after retirement in line with inflation. Actual pension increases are calculated each year based on the level of increase (relative to inflation) that can be afforded in each future year. If future projected increases are negative, then these are capped at zero and a benefit reduction is applied in the current year.

The base case scenario assumes a mature, stable population that has built up over time and with an active population that remains stable in future with new entrants joining to replace those that retire. Deaths are allowed for in line with the mortality assumptions used for annual valuations (i.e, no stochastic modelling of mortality experience).

The scheme is invested in a long-term portfolio of assets expected to generate returns in line with inflation plus 2.5% pa.

Full details of the design and approach for the CDC scheme model are in Appendix 1.

IDC

For IDC, we recognise that there is uncertainty regarding how scheme members will choose to structure their benefits during the decumulation phase. Given this, our illustrations adopt a common investment approach from entry until retirement comprising a significant exposure to growth assets initially but with a gradual reduction in these (though not to zero) as retirement approaches and with contributions set equal to those being applied to the CDC arrangement. From retirement, we consider 3 potential decumulation benefit structures:

1. An initial phase of income drawdown followed by annuitisation at age 80. The withdrawal rate applied to set the drawdown income is based on an inflation-linked annuity with a margin to reflect the additional income potential from continued exposure to growth assets. In this case, we assume the annuitisation is planned in advance and so we allow for a gradual shift in asset allocation to bonds and cash in anticipation. The annuity purchased is assumed to be inflation-linked for a single life.
2. Use of income drawdown for life. The withdrawal rate is set in the same way as the previous case but here the investment strategy remains unaltered throughout retirement.
3. Finally, we also consider the case where an annuity is purchased immediately at retirement (annuity purchased is inflation-linked for a single life).

We recognise that many people purchasing an annuity in practice select a level income to benefit from the higher initial income offered. However, under CDC, we note the ambition is to provide an inflation-linked income and so we have used an inflation-linked annuity throughout for comparability.

Base case – design

Investment returns

In order to capture the way that different arrangements deal with varying investment returns, it is important to consider investment scenarios that reflect volatility from year to year. Investment returns for various asset classes have been generated using Barnett Waddingham's asset risk modelling tool based on conditions at 30 June 2023. This is a real-world scenario generator that outputs a range of scenarios calibrated to return and volatility expectations consistent with the calibration date.

Modelling approach

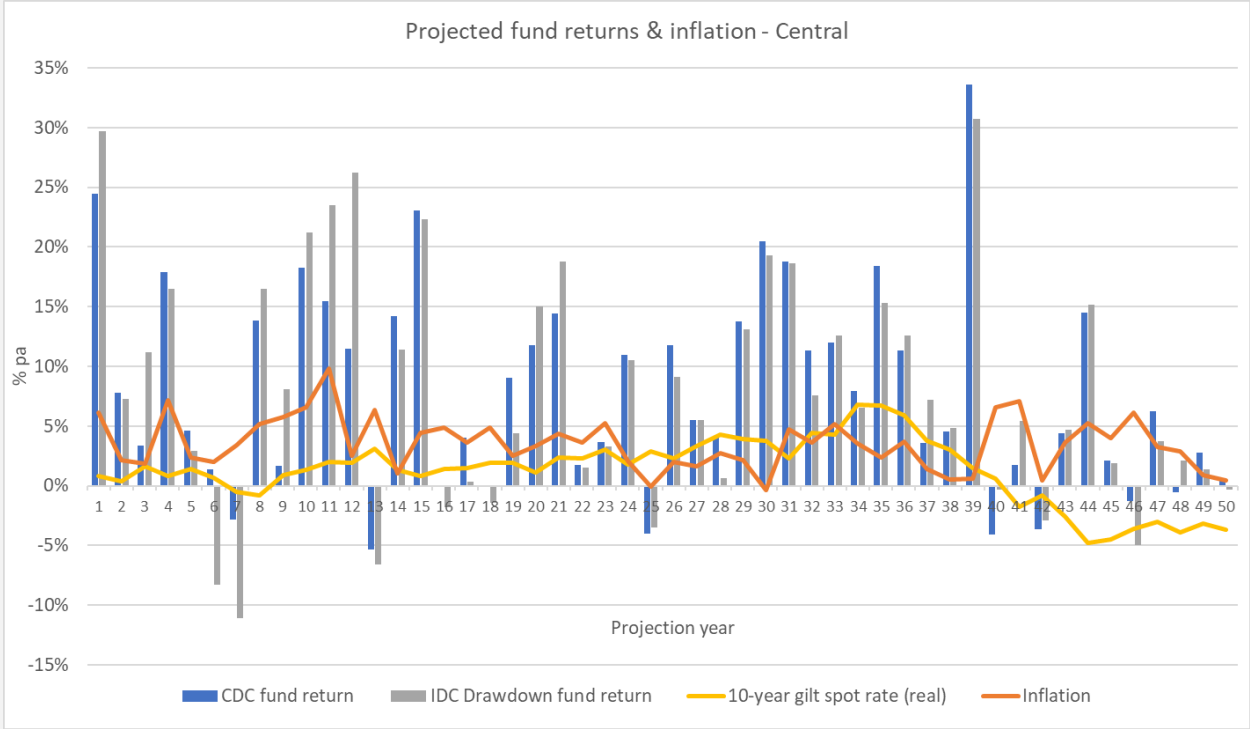
In order to produce these results in time to feed into the ABI's consultation response, there is insufficient time to produce results on a fully stochastic basis, i.e. to program scenario results at the individual level.

Instead we have modelled outcomes deterministically, but used a stochastic model to produce economic scenarios that feed into the deterministic modelling. The results are therefore only reflective of the particular scenario that has been selected and we provide more detail on this in Appendix 4.

The economic scenario selected for the base case is chosen to broadly reflect a median return scenario, which we contrast initially to a simplified linear scenario with broadly consistent long-term returns. An illustration of the returns and financial statistics under this central scenario is shown in the chart above (for CDC this is the pooled fund return and for IDC this is the return assuming drawdown for life strategy for a member age 40 at outset).

We will then show the sensitivity of the volatile scenario results to a "low" return scenario and a "high" return scenario, to illustrate the variability of the CDC and IDC outcomes across allowing for some variation in economic scenarios. Further details of these scenarios are in Appendix 6.

We also consider other sensitivities of the results to different assumptions and elements of product design.



Basis for comparison

We show the following results for comparison between CDC and IDC outcomes:

- Average replacement ratio up to various survival ages - calculated based on the average annual income received up to a specified age, compared with the salary at retirement indexed with inflation each year and averaged over the same period.
- Internal rate of return up to various survival ages - illustrates the effective annual rate of return a member receives on their contributions allowing for both the income received and any benefits available on death.

We also consider members joining each type of scheme at ages: 30, 40 and 50 to provide several points of comparison. In all cases, members join with a salary today of £30,000.

Further details on the calculation of these metrics are set out in Appendix 5.

Base case – central scenario (no volatility)

Age 30

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	51%	55%	55%	50%
80	55%	55%	55%	50%
90	67%	54%	55%	50%

Age 40

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	33%	35%	35%	32%
80	35%	35%	35%	32%
90	42%	35%	35%	32%

Age 50

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	19%	20%	20%	18%
80	20%	20%	20%	18%
90	23%	19%	20%	18%

Comments

- As noted above, the base case is designed to reflect an investment scenario, broadly leading to median returns.
- In the first instance we have used constant returns calculated based on the average returns over the first 40 years of data in this scenario. This removes the year-on-year volatility from the scenario and aims to present a baseline result for further comparison.
- The CDC and IDC results in isolation are in line with expectations:
  - Replacement ratios steadily increase with age for the CDC scheme; investment returns are consistently above inflation which means that above-inflation increases are granted over the long term and so average income increases relative to the indexed pre-retirement salary
  - Replacement ratios for IDC are broadly stable by age. For the annuity option this is clearly expected as we compare an index-linked annuity income with an income benchmark subject to the same indexation. For income drawdown, the initial withdrawal rate is based on the index-linked annuity with a positive margin to allow for the potential for higher income arising from continued exposure to growth assets. Furthermore, we assume no reviews of withdrawal rates during retirement and accept this is a simplification as reviews can reflect realised investment performance and help mitigate the risk of fund exhaustion. As such, drawdown income is expected to be stable in real-terms until either an annuity is purchased at age 80 or funds are exhausted and income ceases.
- The more interesting result is that CDC and IDC drawdown outcomes are similar in the early years of retirement, and it is only later in retirement that CDC begins to offer better outcomes. This is likely a result of the different strategies being taken in the CDC and IDC options.

Base case – central scenario (no volatility)

Age 30

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	3.9%	8.1%	8.1%	3.8%
80	6.3%	8.1%	8.1%	6.0%
90	8.4%	8.0%	8.1%	7.7%

Age 40

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	2.5%	7.9%	7.9%	2.3%
80	5.6%	7.9%	7.9%	5.2%
90	8.2%	7.8%	7.9%	7.4%

Age 50

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	0.3%	7.5%	7.5%	-0.2%
80	4.7%	7.6%	7.7%	3.9%
90	8.0%	7.5%	7.7%	7.0%

Comments

- The internal rate of return results show a similar picture, albeit with one key difference.
- The value of the residual drawdown fund payable on death results in a much higher IRR where drawdown is being utilised. This effectively leads to a stable return in drawdown scenarios assuming the fund does not run out (which will be illustrated in more detail later).
- Where no drawdown exists, i.e., for CDC and IDC with immediate annuitisation, the IRR increases with survival age as more income is received and thus better value achieved from the contributions paid.
- The CDC return for survival to age 90 is generally higher than under IDC regardless of the approach taken. This is in part because of the way that the CDC arrangement in this scenario is able to pay increases consistently above inflation, though CDC would also be expected to be more valuable if an individual lives longer than expected because of the pooling of longevity risk as longer-lived members benefit from mortality credits arising from those who die younger.
- Overall, we consider these baseline results to be reasonable and further results illustrate the impact of introducing investment volatility to our scenarios.

Base case – central scenario (with volatility)

Age 30

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	50% (51%)	70% (55%)	70% (55%)	65% (50%)
80	54% (55%)	70% (55%)	70% (55%)	65% (50%)
90	49% (67%)	54% (54%)	53% (55%)	65% (50%)

Age 40

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	29% (33%)	26% (35%)	26% (35%)	23% (32%)
80	32% (35%)	26% (35%)	26% (35%)	23% (32%)
90	39% (42%)	50% (35%)	26% (35%)	23% (32%)

Age 50

Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	18% (19%)	15% (20%)	15% (20%)	14% (18%)
80	18% (20%)	15% (20%)	15% (20%)	14% (18%)
90	21% (23%)	15% (19%)	15% (20%)	14% (18%)

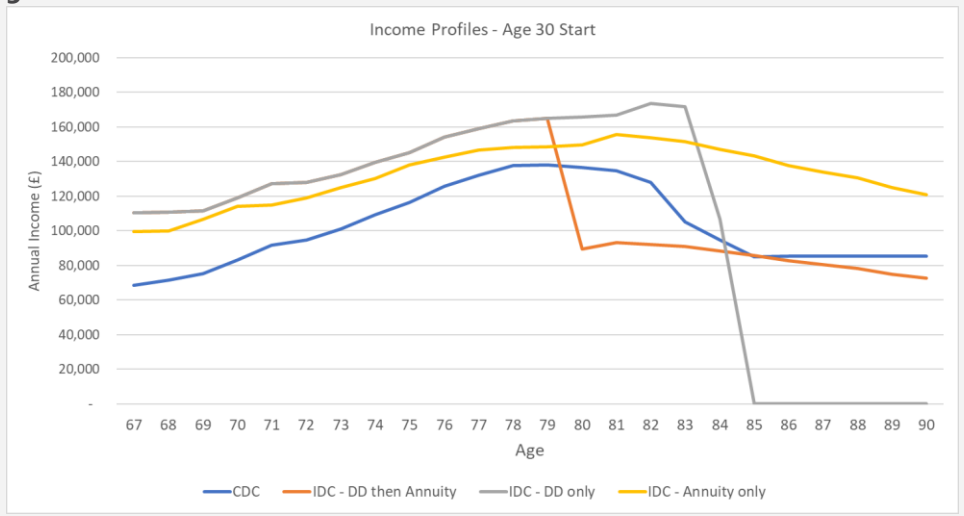
Comments

- These results illustrate the impact of introducing investment return volatility. For ease of comparison, the figures in brackets are those from the no-volatility scenario.
- In general, the results show that, compared with the constant return scenario, the volatile scenario leads to slightly worse outcomes in terms of the average replacement ratio, but this can vary significantly by individual. This is predominantly because of a particularly good run of investment returns in years 29 to 36 of the scenario and a run of poor returns in between years 50 and 60.
- **30 year-old -** for this member the strong returns fall in the accumulation phase and boost the accumulated fund at retirement and the income available increasing the replacement ratio to 70%. Subsequent returns during drawdown are lower (including the run of poor returns noted above) resulting in either a reduced annuity income from age 80 or eventual fund exhaustion under drawdown illustrated by the lower replacement ratio at age 90.
- **40 year-old** - for this member, the set of strong returns occurs during the drawdown phase and significantly improves the fund value during this period in relation to the income being taken. At age 80, the member is therefore able to purchase a higher annuity income. Improving the replacement ratio to 50%.
- **50 year-old** - the results for this member are more stable as the periods of particularly strong or poor returns have little impact.
- From the results, we see that the average income replacement ratios under CDC are less influenced by investment return volatility.
- Finally, we note that in the presence of investment return volatility neither approach delivers the higher income replacement ratio in all cases.

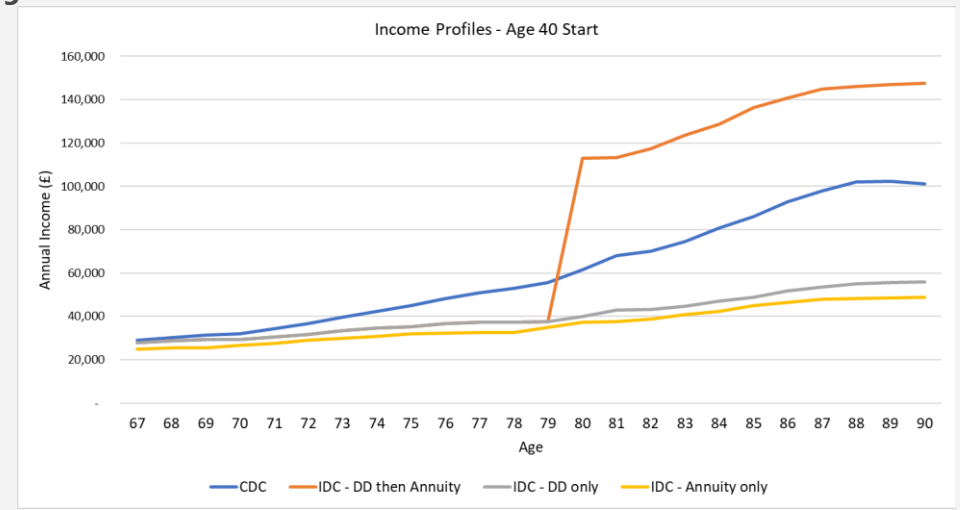
The income profiles behind these results are illustrated graphically on the next page.

Base case – central scenario (with volatility) – income profiles

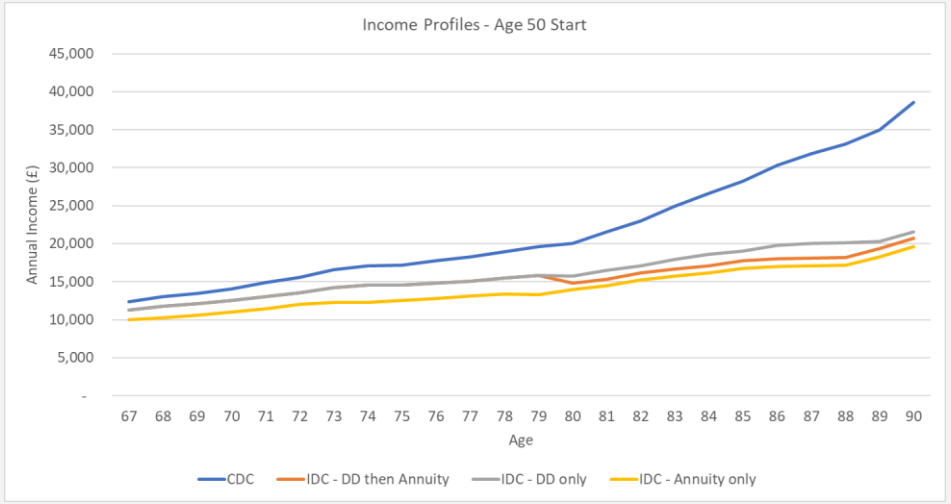
Age 30



Age 40



Age 50



Comments

- These charts show the income profiles during retirement of the different products assuming a different entry age, with a starting salary of £30,000 in each case.
- For age 30, the drawdown only income stops after age 84 indicating the fund has exhausted.
- The period of strong returns occurs after age 67 for the 40 year old and the fund at annuitisation age is sufficient to uplift the income post purchase.

Note – the results for all of the volatile scenarios are dependent on the economic scenarios selected to illustrate sample outcomes in the absence of a full distribution of outcomes. Selection of an alternative set of scenarios would produce different results.

Base case – central scenario (with volatility)

Age 30

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	3.4% (3.9%)	8.4% (8.1%)	8.4% (8.1%)	4.8% (3.8%)
80	5.9% (6.3%)	8.2% (8.1%)	8.2% (8.1%)	6.9% (6.0%)
90	7.3% (8.4%)	8.0% (8.0%)	8.0% (8.1%)	8.2% (7.7%)

Age 40

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	1.4% (2.5%)	8.0% (7.9%)	8.0% (7.9%)	-0.3% (2.3%)
80	4.8% (5.6%)	8.4% (7.9%)	8.1% (7.9%)	3.1% (5.2%)
90	7.6% (8.2%)	8.2% (7.8%)	7.2% (7.9%)	5.7% (7.4%)

Age 50

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	0.4% (0.3%)	6.4% (7.5%)	6.4% (7.5%)	-2% (-0.2%)
80	4.5% (4.7%)	6.4% (7.6%)	6.7% (7.7%)	2.4% (3.9%)
90	7.7% (8.0%)	6.3% (7.5%)	7.3% (7.7%)	5.6% (7%)

Comments

- The IRR results show a similar story to what we see on the replacement ratio metrics.
- However, as the IRRs allow for both income and death benefits, they can show different patterns in some cases. This because, under income drawdown, they reflect the impact of the profile of investment returns on the residual funds available to dependants in addition to the impact on income levels.

Variability under investment return scenarios

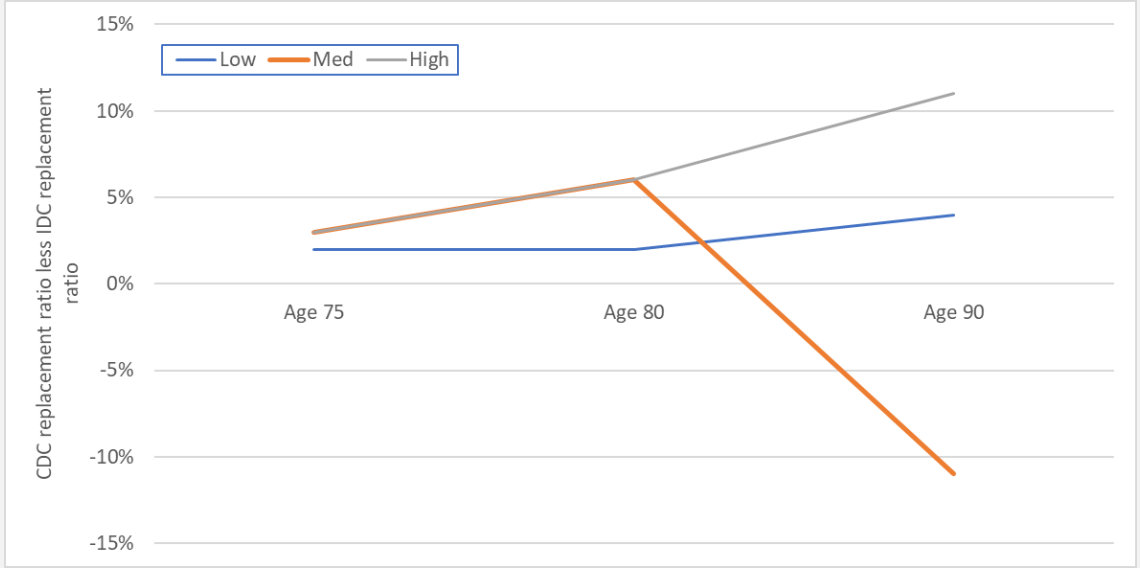
Here we illustrate the potential variability of outcomes around the central scenario, by comparing the results metrics with those that arise from "low" return and "high" return volatile economic scenarios – reflecting broadly 25th percentile and 75th percentile returns respectively.

The charts to the right show how the difference between CDC and IDC outcomes vary across the different scenarios. For simplicity we focus on the outcomes for a member aged 40 at outset and IDC benefits are assumed to be taken as income drawdown followed by an annuity at age 80.

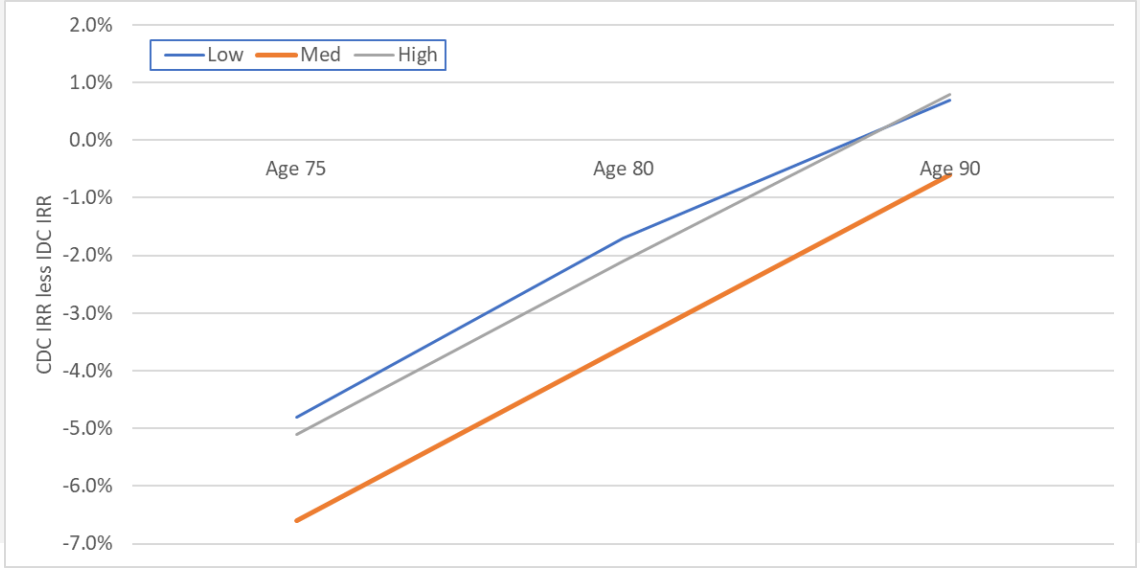
Comments

- Differences between the CDC and IDC outcome are lower in the low investment scenario, likely because the absolute differences within the CDC and IDC results are lower.
- The differences in replacement ratio remain the same between the base case and the high return scenario, except at age 90 where the sequence of strong returns in the central scenario noted earlier significantly increases the annuity income purchased at age 80 and increases the IDC replacement ratio versus CDC. This feature is not present in the high return scenario.
- The IRR results allow for both income and any residual drawdown fund on death and are more stable with a similar pattern of differences to CDC exhibited in each scenario. Where death occurs at age 75 or 80 then IDC offers the higher IRR but the advantage shifts in favour of CDC where death occurs at age 90.

Replacement ratio



Internal rate of return



New vs Stable CDC

So far we have considered the outcomes from a mature, stable CDC arrangement. So far in the UK, no such scheme exists. The "build-up" phase of a CDC scheme will be important and outcomes for members may differ because:

- The investment strategy may be different in the early phase, as it would be feasible to hold a much higher proportion of growth assets as scheme cash-flow is expected to be strongly positive
- Charges may be higher as the arrangement may not yet have the benefit of scale, e.g., valuation costs are likely to be fixed and so will be relatively higher in the earlier years

Appendix 2 includes our approach to adapting our CDC model for the build-up scenario.

The table below shows the results for a member joining a new CDC scheme at age 40 in the base case investment scenario.

Survival age	Average replacement ratio		IRR	
	Stable CDC	New CDC	Stable CDC	New CDC
75	29%	27%	1.4%	0.8%
80	32%	29%	4.8%	4.3%
90	39%	34%	7.6%	7.1%

This shows that outcomes are expected to be slightly worse in all cases and suggests that CDC schemes will need to reach scale quickly in order to provide the best outcomes to members.

The speed with which a scheme reaches scale will depend on a number of factors, for example a scheme for a single, large employer is likely to reach scale quicker than a multi-employer master trust which will have to compete for employers to sign up. The longer it takes to reach scale, the more impact this will have on outcomes.

Sequencing of returns

We have mentioned above that the sequencing of returns is important in determining the outcome in a particular scenario and this is reflected in the results allowing for the volatility of investment returns. The results below show the impact a separate scenario designed to illustrate poor returns over the first 10 years, whilst being broadly average overall.

Survival age	Average replacement ratio		IRR	
	Stable CDC	New CDC	Stable CDC	New CDC
75	20%	21%	-3.9%	-3.4%
80	19%	20%	-0.8%	-0.5%
90	20%	20%	2.0%	2.2%

The first thing to note here is that the sequencing scenario provides much worse outcomes in general than the base case. This is a particular feature of the scenario chosen and illustrates the ranges of outcomes that could apply in something that could be considered to be a median case.

Putting that to one side, we see that in the whole-life case there is no real impact of sequencing for a new scheme compared to a stable one, because in the early years of build-up only a small amount of benefit has already been accrued to be impacted by poor returns.

Perhaps the more important point here is that the level of early increases granted will be important in establishing momentum. For example, in a competitive multi-employer master trust market, a scheme that is unable to pay target increases or has to cut benefits in the early years may not be attractive enough to compete and may not reach scale at all.

A related uncertainty is how quickly a new CDC scheme would reach scale in practice – this could be either faster or slower than originally expected. In either case there could be a knock-on impact on the timing and direction of changes to the investment strategy, which would then be different to the initial communication of the investment strategy to members.

Impact of longevity changes

In a whole-of-life context, contribution rates for CDC schemes will be set allowing for certain mortality assumptions. To the extent that actual mortality is then different, over time this will lead to notional "surplus" or "deficit" which will be rebalanced through changes to the increase profile.

For example, if life expectancies were to significantly increase over time, this would create a strain that would mean increases could not be as high, all else being equal.

We have modelled this by changing the cashflow profile of our sample scheme to reflect much higher mortality improvements in future years for the CDC population overall. Specifically, we have adjusted our mortality assumptions to allow for an initial addition to improvements of 2% pa and a long-term rate of improvement of 3% pa.

The results for a member currently aged 40 surviving until age 75, 80 or 90, with the base case for comparison, are shown below.

Survival age	Average replacement ratio		IRR	
	CDC	CDC with longevity strain	CDC	CDC with longevity strain
75	29%	26%	1.4%	0.4%
80	32%	27%	4.8%	4.0%
90	39%	31%	7.6%	6.8%

This shows that, over time, outcomes would be expected to be lower as members of the scheme live longer on average. The difference is more significant for someone reaching age 90 than for someone reaching age 75, and indeed we would expect the difference to be greater for a member aged 30 then for a member aged 40 or 50.

The changes to the assumptions here are relatively extreme and result in around a 10% increase in life expectancy. This is broadly reflective of the improvement since the 1950s and so we believe this is a reasonable scenario to consider as a way of stressing the model to changes in the mortality assumptions. However, it is worth noting that a lot of the factors driving improvements to life expectancy in the latter half of the 20th century are one-off impacts and would not be expected to reoccur.

Clearly the impact of a sudden shock impacting on life expectancies could be significant, for example significant advances in cancer care could lead to a large increase in future life expectancy. This would likely have implications for the valuations of a CDC scheme that would affect short term increases, albeit the actual impact on longevity pooling in the arrangement would be unlikely to be felt until this experience started to come through in practice.

Such a shock would also have a wider, systemic impact on pension provision across the industry and would not be confined to CDC arrangements.

IDC - further scenarios

Under IDC we have considered two further scenarios for a member currently aged 40:

- Drawdown then planned annuitisation but with annuitisation occurring at an earlier age (age 75 vs age 80 in base).
- Purchasing an annuity underpin at retirement with 25% of the fund. Allowing for the State Pension, this would provide a level of guaranteed inflation-linked income above the "minimum" requirement of the Pensions and Lifetime Savings Association (PLSA) Retirement Living Standards. The remaining 75% of the fund is applied to income drawdown for life with the annuity underpin supporting a slightly higher growth asset mix (65% growth/35% defensive).

Survival age	Average replacement ratio			
	CDC	Base IDC	Annuitisation at age 75	Combined Approach
75	29%	26%	26%	25%
80	32%	26%	30%	25%
90	39%	50%	34%	25%

Survival age	IRR			
	CDC	Base IDC	Annuitisation at age 75	Combined Approach
75	1.4%	8.0%	7.2%	7.6%
80	4.8%	8.4%	4.5%	7.7%
90	7.6%	8.2%	7.1%	7.0%

To be clear, in each case the "Base IDC" results we compare with are those in the central scenario (with volatility) using drawdown with annuitisation at age 80.

Earlier annuitisation

- As noted earlier, the fund returns are strong in this scenario during the early period of retirement for a member aged 40. Consequently, a member annuitising earlier receives less benefit from this and the average replacement ratio falls at the later ages when compared to the base scenario.
- The lower IRR reflects the earlier glide path into defensive assets which translates into lower returns and a lower death benefit at age 75. Having annuitized at 75, there is no residual fund upon death at age 80 and so the IRR is significantly lower than under the base case.

Combined approach

- The replacement ratios are stable across the three survival ages as the income under both the drawdown and annuity is set at retirement and follows inflation (and the fund does not run out).
- The drawdown component will see a higher return in the initial drawdown phase but the impact of purchasing the annuity at outset results in a net reduction of the overall IRR.

Further comments

Running off a CDC scheme

Above we talk about what CDC outcomes might look like as a new scheme builds up. A further question is what outcomes might look like when a CDC arrangement comes to run-off.

The proposed regulatory regime for a wider CDC market effectively suggests that trustees of a CDC arrangement looking to close the scheme will either need to find a way to discharge liabilities (e.g., via transfer to another CDC scheme) and wind-up, or run the scheme on in a sustainable way for as long as is feasible.

There are several reasons why running off a CDC scheme could lead to worse outcomes for members:

- The investment strategy could become more restricted, or subject to more disinvestment risk following the cessation of contributions.
- Average costs are likely to increase as the pool of assets and number of members declines.

It is also possible that at some point in future there would be no other CDC scheme to transfer to, and that the only option available to the trustees to discharge liabilities is to purchase annuities, which may mean reducing benefits depending on the rates available at the time.

Fixed pension vs inflationary increases

The existing CDC regime is very focused on providing inflation-linked increases and, given the level of inflation over the last 12-18 months, there are perhaps few that would disagree with this ambition. Nevertheless, many people who buy an annuity purchase a level income due to the appeal of having a higher income level early in retirement and so it is possible that there would be demand for a CDC scheme that targeted a fixed pension.

The challenge of this type of arrangement would be that nominal benefit cuts are likely to happen more often, i.e.:

- if the target is a fixed pension and asset returns in one year are lower than expected, then the amount of fixed pension that is funded for will be lower – resulting in an immediate benefit reduction.
- if the target is a pension increasing in line with inflation, then even if low asset returns mean a full inflation increase can't be given in one year there is still scope to pay an increase that is below target – so partial indexation rather than a reduction.
- further, funding for increases in future means that those assumed future increases can be reduced (to rebalance the funding position) before current benefits are cut – this reduces the year-to-year volatility of the increase given.

Operating a scheme with this design therefore relies heavily on members understanding the concept of CDC, in particular the value of the higher initial pension and how likely these benefit reductions are.

Modelling our CDC arrangement targeting a fixed pension would likely result in different results for some scenarios compared with those presented for the inflation-linked pension, as our model balances the annual valuation around current and projected future increases. In practice a scheme targeting a fixed pension would likely invest slightly differently to one targeting an inflationary increase which may lead to slightly different returns.

On the IDC side, then use of a level annuity would, other things being equal, be expected to increase the average replacement rates early in retirement (as the initial income is higher than for the inflation-linked annuity) but the effect will diminish and eventually reverse later in retirement as the inflation-linked income exceeds the level amount.

Contemporary modelling: decumulation only

Base case – design

The base case scenario for the decumulation-only modelling builds on the modelling used for the whole-life modelling. In particular, the economic scenarios used are the same as those used in the whole-of-life modelling.

CDC scheme

The CDC scheme we have modelled for decumulation-only has the same increase and reduction mechanism as used in the whole-of-life modelling. Incoming pensioners "buy" an amount of initial annual pension on entry, which is calculated by converting their lump sum pot using pricing factor derived on the same assumptions used for the annual valuation. Actual pension increases are calculated each year based on the level of increase (relative to inflation) that can be afforded in each future year. If future projected increases are negative, then these are capped at zero and a benefit reduction is applied in the current year.

The base case scenario assumes a mature, stable pensioner population that has built up over time and allows for a new cohort of retirees to join each year.

The scheme is invested in a long-term portfolio of assets expected to generate returns in line with inflation plus 2.0% pa.

Full details of the design and approach for the CDC scheme model are in Appendix 2.

IDC

For IDC, the decumulation-only modelling follows closely that of the whole-of-life situation but uses a constant retirement fund applied at age 67. From retirement, we consider the same 3 potential decumulation benefit structures as were considered in the whole-of-life case, namely:

1. An initial phase of income drawdown followed by annuitisation at age 80. The withdrawal rate applied to set the drawdown income is based on an inflation-linked annuity with a margin to reflect the additional income potential from continued exposure to growth assets. In this case, we assume the annuitisation is planned in advance and so we allow for a gradual shift in asset allocation to bonds and cash in anticipation. The annuity purchased is assumed to be inflation-linked for a single life.
2. Use of income drawdown for life. The withdrawal rate is set in the same way as the previous case but here the investment strategy remains unaltered throughout retirement.
3. Finally, we also consider the case where an annuity is purchased immediately at retirement (annuity purchased is inflation-linked for a single life).

Basis for comparison

For the decumulation-only case, we consider an individual retiring at age 67 who is commencing decumulation with a pot of £150,000 and a salary immediately prior to retirement of £30,000.

We use the same metrics to compare the decumulation-only results as for the whole-of-life results.

Base case – Results

Immediate retirement at age 67 – central scenario (no volatility)

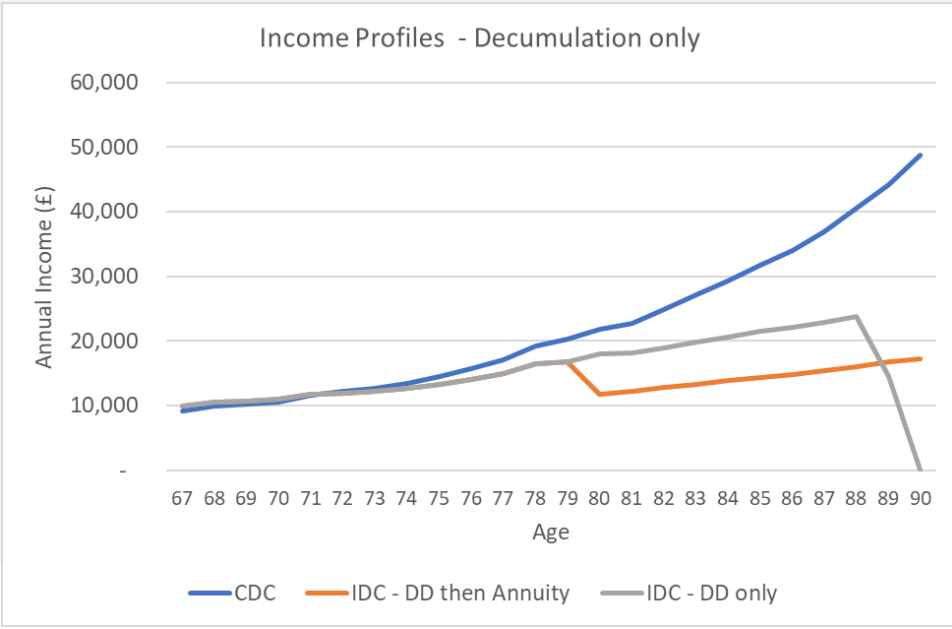
Survival age	Average replacement ratio			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	32%	33%	33%	30%
80	34%	33%	33%	30%
90	44%	32%	33%	30%

Immediate retirement at age 67 – central scenario (with volatility)

Survival age	Average replacement ratio		
	CDC	IDC – DD then Annuity	IDC – DD only
75	33%	33%	33%
80	35%	33%	33%
90	43%	27%	32%

Comments

- Here we present results using the same investment scenarios considered in the whole-of-life case but now applied to the situation where our example member retires immediately aged 67.
- Again, we see broadly similar results between CDC and IDC in the early years but with higher average replacement ratios for CDC at age 90. This is partly due to the scenario, which allows the CDC scheme to pay consistently above-target increases.
- Introducing volatility also has less of an impact in the decumulation only case. However, this is likely a function of time – in the whole-of-life scenario we are considering outcomes over periods between 25 and 60 years, whereas in this illustrations we are considering a maximum period of 23 years.



Base case – Results

Immediate retirement at age 67 – central scenario (no volatility)

Survival age	IRR			
	CDC	IDC – DD then Annuity	IDC – DD only	IDC – Annuity only
75	-11.5%	6.8%	6.8%	-11.7%
80	1.2%	7.1%	7.2%	-0.6%
90	9.1%	7.0%	7.3%	6.0%

Immediate retirement at age 67 – central scenario (with volatility)

Survival age	IRR		
	CDC	IDC – DD then Annuity	IDC – DD only
75	-10.7%	6.3%	6.3%
80	2.3%	6.7%	7.2%
90	9.8%	6.5%	7.7%

Comments

- Here we present results using the same investment scenarios considered in the whole-of-life case but now applied to the situation where our example member retires immediately aged 67.
- These results show the stark difference in value between drawdown and CDC/annuity if death occurs earlier than expected – i.e. the value of the residual drawdown fund payable on death results in benefits being paid where drawdown is being utilised, whereas no benefit is paid under CDC or annuity only.
- In the decumulation-only approach, this is exacerbated relative to the whole-of-life case because the value of the pot is "paid" at the time of retirement rather than being spread over an active working lifetime.

Variability under investment return scenarios

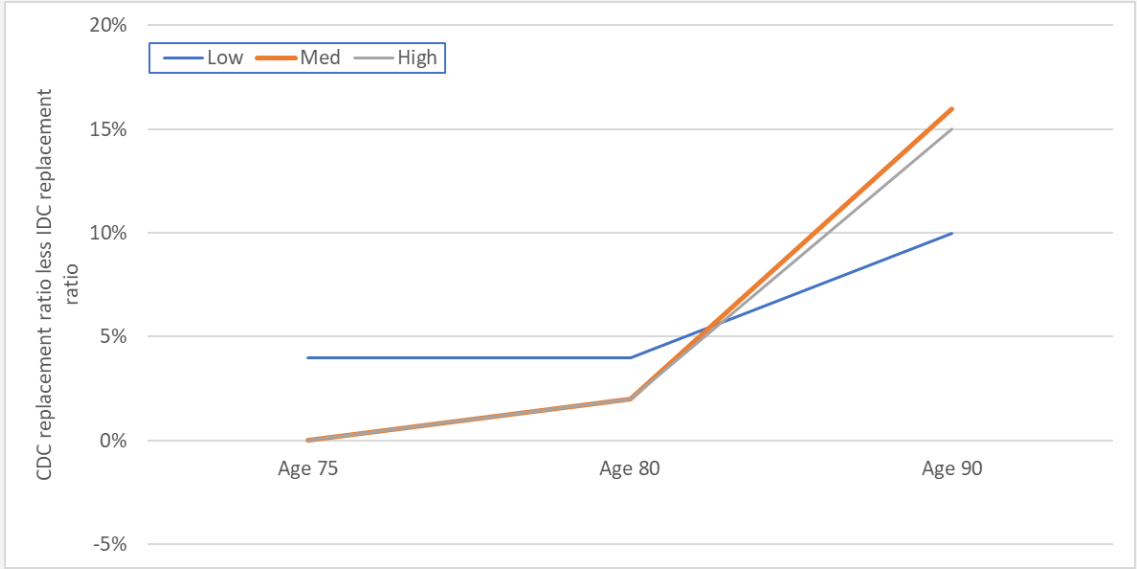
Here we illustrate the potential variability of outcomes around the central scenario, by comparing the results metrics with those that arise from "low" return and "high" return volatile economic scenarios – reflecting broadly 25th percentile and 75th percentile returns respectively.

The charts to the right show how the difference between CDC and IDC outcomes vary across the different scenarios in decumulation for a member retiring immediately at age 67. For simplicity we focus on the outcomes where IDC benefits are assumed to be taken as income drawdown followed by an annuity at age 80.

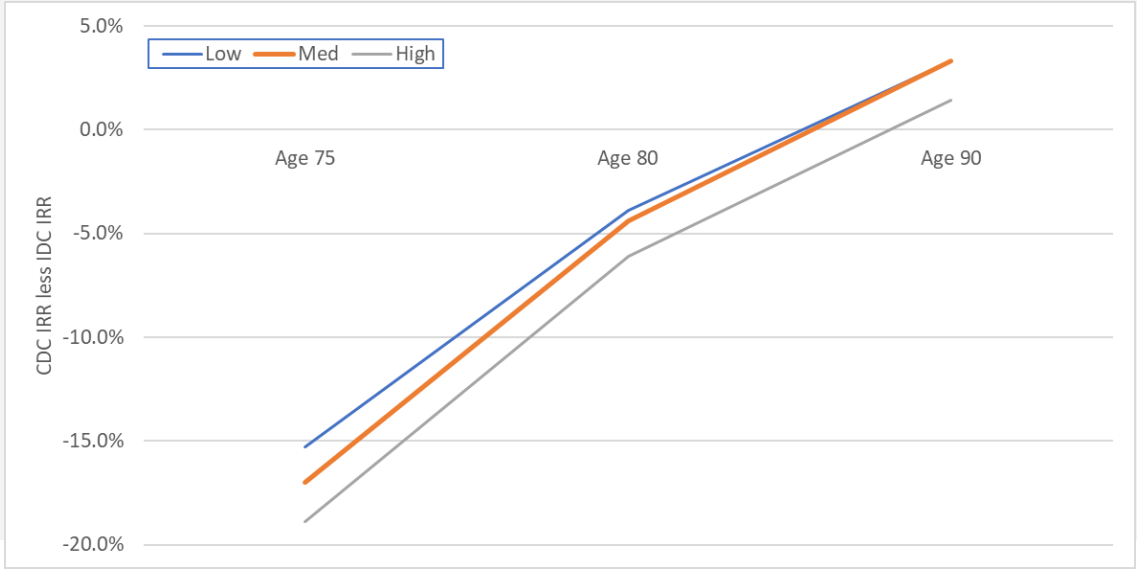
Comments

- Differences between the CDC and IDC outcome are more consistent across all ages in the low investment scenario, likely because the absolute differences within the CDC and IDC results are lower.
- In the median and high scenarios, there is much more variation in the difference between CDC and IDC replacement ratios at different ages, likely because the CDC increases awarded after 80 under these scenarios are higher than the inflation-linked increases from an annuity.
- The differences in replacement ratio remain the same between the base case and the high return scenario, even through to age 90. (This differs to the whole of life case for an age 40 member because the sequence of strong returns in the central scenario noted earlier are beyond the lifespan of a member aged 67 at outset.)
- As for the whole of life case, the IRR results allow for both income and any residual drawdown fund on death and are more stable with a similar pattern of differences to CDC exhibited in each scenario. Where death occurs at age 75 or 80 then IDC offers the higher IRR but the advantage shifts in favour of CDC where death occurs at age 90.

Replacement ratio



Internal rate of return



New vs Stable CDC

As for the whole-life case, we have considered how a decumulation-only arrangement might react in a build-up case. Arguably this is more important in a decumulation-only arrangement, as this will be required to pay out benefits immediately whereas the whole-life arrangement will have time where members are accruing benefits before they need to be paid.

Appendix 2 includes our approach to adapting our CDC model for the build-up scenario.

The table below shows the results for a member joining a new CDC decumulation scheme at age 67 in the base case investment scenario.

Survival age	Average replacement ratio		IRR	
	Stable CDC	New CDC	Stable CDC	New CDC
75	33%	32%	-10.7%	-10.8%
80	35%	34%	2.3%	1.8%
90	43%	39%	9.8%	9.2%

This reinforces the result of the whole-life case that outcomes are expected to be slightly worse when starting from scratch, and suggests that CDC schemes will need to reach scale quickly in order to provide the best outcomes to members. We also note here that the build-up scenario creates a drag where increases are not able to keep up with inflation, which emphasises this point.

It is arguably harder for a decumulation-only arrangement reach scale than in the whole-life case, particularly if there is a competitive market for these arrangements. The table above shows the importance of scale in providing better outcomes for members, but it is very unlikely that there will be arrangements who can engage a large pool of pensioners from the outset.

It may therefore be the case that such arrangements will need some kind of transitional arrangement, e.g. to operate as an IDC drawdown vehicle until such time as offering a CDC pension becomes feasible, or for them to be seeded at the outset via capital (e.g. from the provider or a third party) which is drawn down over time as members enter. Both of these approaches would come with significant challenges.

Sequencing of returns

Sequencing of returns is likely to be more important in a decumulation-only arrangement where benefits are being paid immediately. The table below shows results using the low initial returns scenario.

Survival age	Average replacement ratio		IRR	
	Stable CDC	New CDC	Stable CDC	New CDC
75	31%	26%	-10.0%	-13.5%
80	30%	21%	2.6%	-2.2%
90	30%	19%	8.7%	4.5%

Here we see that this scenario does lead to lower outcomes even in a stable case, as the poor run of returns limits the ability for the scheme to pay target increases. This is particularly the case in the build-up scenario – reductions to outcomes are limited initially but the drag created by the continued run of poor experience leads to consistent below target increases and a significantly worse outcome for members at the outset who live longer than expected.

Overall, these results show that scale will be incredibly important to a decumulation-only arrangement and, as discussed, this is not necessarily easy to achieve.

Impact of longevity changes

In the decumulation only case for a CDC scheme, the pricing factor for "buying in" at retirement will be set allowing for certain mortality assumptions (e.g. in line with the assumptions used for the annual valuation. To the extent that actual mortality is then different to the assumption used in pricing, over time this will lead to notional "surplus" or "deficit" which will be rebalanced through changes to the increase profile.

For example, if life expectancies were to significantly increase over time, this would create a strain that would mean increases could not be as high, all else being equal.

As for the whole of life scheme, we have modelled this by changing the cashflow profile of our sample scheme to reflect much higher mortality improvements in future years for the CDC population overall, but without changing the assumptions used for pricing. Specifically, we have adjusted our mortality assumptions to allow for an initial addition to improvements of 2% pa and a long-term rate of improvement of 3% pa.

The results for a member retiring at 67 and surviving to age 75, 80 or 90, with the base case for comparison, are shown below.

Survival age	Average replacement ratio		IRR	
	CDC	CDC with longevity strain	CDC	CDC with longevity strain
75	33%	30%	-10.7%	-12.2%
80	35%	30%	2.3%	0.3%
90	43%	30%	9.8%	7.3%

This shows that, over time, outcomes would be expected to be lower as members of the scheme live longer on average. The difference is more significant for someone reaching age 90 than for someone reaching age 75, as the benefits of mortality pooling contributing to annual increases for survivors are not as great in the longevity strain scenario where more members are living longer.

As noted in the whole of life scenario, this results in a relatively extreme increase in life expectancy, and the same comments around the likelihood of this magnitude of increase occurring apply equally here.

Potential for pricing changes and underwriting

One way to potentially mitigate some of the effects from increasing longevity for new entrants would be to revise the pricing assumptions regularly, which may well happen naturally over time as valuation assumptions are updated for the latest trends in mortality.

In theory, decumulation only CDC schemes could consider some form of underwriting when pricing for new entrants, to attempt to allow for member-specific mortality which could reduce some of the longevity risk. However, we see that this could a) disrupt the desired effect of mortality pooling and b) cause additional complexity for annual valuations (if each individual has a different mortality assumption).

A knock-on effect could be the selection risk that members choosing to join the CDC scheme are heavily weighted to those being offered better pricing terms.

We also expect that a simplified approach of using size of fund paid into a CDC decumulation arrangement as a proxy for overall wealth (and therefore mortality) is unlikely to be appropriate as individuals may be using CDC in decumulation alongside other sources of pension provision.

IDC – further scenarios

Similarly to the whole-of-life modelling, we have also included a combined approach where 25% of the fund is immediately used to purchase an annuity and the remaining 75% is used for income drawdown.

We extend this to allow for the different investment scenarios that we have described previously.

Survival age	Average replacement ratio			
	Base (central volatile)	Combined (central non-volatile)	Combined (central volatile)	Combined (alternative return profile)
75	33%	32%	32%	25%
80	33%	32%	32%	25%
90	27%	32%	32%	20%

Survival age	IRR			
	Base (central volatile)	Combined (central non-volatile)	Combined (central volatile)	Combined (alternative return profile)
75	6.3%	4.7%	4.0%	0.3%
80	6.7%	6.3%	6.5%	3.4%
90	6.5%	7.4%	7.5%	5.4%

Comments

Here we present results using the same investment scenarios considered in the whole-of-life case but now applied to the situation where our example member retires immediately aged 67.

- Similarly, to the whole-of-life model, when combining annuity and drawdown, the replacement ratio is constant across all ages up to age 90. This because the both annuity rate and drawdown income are set at outset and increase in line with inflation. In the central investment scenarios, the drawdown fund doesn't deplete before age 90, and is able to support an income throughout.
- By construction of the drawdown income rate, the base model of 100% drawdown to begin offers a higher initial income compared with the 25%/75% mix of annuity and drawdown (33% replacement ratio versus 32%). Although we note that due to the fund returns in the volatile scenario, the combination of the amount of residual fund at age 80 and the annuity pricing offered means a drop in income in later retirement following annuitisation (27% replacement ratio versus 32%).
- In this instance, the alternative sequencing of returns scenario has a relatively modest loss to begin, and a lower nominal starting income than the central volatile scenario. However, a two-year period of double-digit inflation and negative fund returns rapidly increases income and reduces fund value, to negatively impact the ability of the fund to support an income, leading to income depletion after age 88. This explains the fall in the replacement ratio.

IDC – further scenarios

Similarly to CDC we also illustrate the impact of an investment scenario with a broadly similar overall return to the base but with a different shape of returns.

Survival age	Average replacement ratio		
	Base (central volatile)	Base (alternative return profile)	Drawdown for Life (alternative return profile)
75	33%	26%	26%
80	33%	26%	26%
90	27%	18%	22%

Survival age	IRR		
	Base (central volatile)	Base (alternative return profile)	Drawdown for Life (alternative return profile)
75	7.4%	4.2%	4.2%
80	7.6%	5.7%	5.7%
90	7.2%	5.0%	6.6%

Comments

Here we present results using the same investment scenarios considered in the whole-of-life case but now applied to the situation where our example member retires immediately aged 67.

- Similarly, to the result in the previous page, the poorer performance in the alternative sequence of returns scenario is driven by a couple of years of double-digit inflation and negative fund returns. Although income starts off comparatively lower, these couple of years rapidly deplete the fund, and impact on its ability to support an income. For the Base IDC product (drawdown followed by annuity at age 80) this leads to a lower residual fund at age 80 and a bigger drop in income provided by the annuity purchased at this age. For the drawdown for life model, this results in earlier depletion of the fund.
- The lower income to begin and lower returns to begin, also reduces the level of IRR.

Further comments

Different pot sizes
One question posed by the DWP in its consultation is whether there is a breakeven point for providing certain decumulation products or services, including CDC arrangements.

One thing that has been emphasised by our modelling is that individual outcomes will be highly influenced by that individual's actual experience, i.e., generally speaking you will not know what product will give you the best outcome until you have all of the information available, by which time it will be too late!

In our view, the impact of pot size is effectively a question of selection. Generally speaking, we would expect those with smaller pots to either cash these immediately or draw them down over a short period, i.e., small pots are not seen as a realistic provider of long-term income in retirement.

Although there are a number of reasons why an individual may have a smaller pot at retirement, we would generally expect more affluent individuals to have a larger pot. Therefore, if it is larger pots that will be typically looking towards CDC as a way of providing a hedge against life expectancy, and this feature of the population is recognised, this will likely have an influence on how CDC decumulation is priced.

This could be detrimental to someone with a smaller pot who might have a lower life expectancy than the average in the arrangement. However, again the actual outcome is entirely dependent on that individual's experience.

This illustrates one of the key hurdles that CDC will have to overcome, particularly in decumulation; namely that it will further complicate the choices an individual needs to make when they retire. As noted, there are unlikely to be simple rules that will dictate e.g., "if my pot size is less than Amount X then I should take Action Y" and individuals who already have the choice of cash, drawdown, annuities or some combination of them, will potentially also have CDC thrown into the mix.

Given this, it seems likely that if CDC decumulation is to become a genuine option, it lends additional weight to the already well recognised challenge of how to effectively and efficiently support, guide and potentially advise individuals having to make these decisions.

Underwriting
In a decumulation only context, a CDC scheme is likely to require members to undergo a degree of medical underwriting at entry in pursuit of a fair calculation of benefits recognising significant differences in life expectancy.

The situation is similar on the IDC side where an annuity is purchased. However, we note that where annuity purchase is deferred from age 67 (retirement) to age 80, there is scope to recognise health impairments that emerge, or become more serious, during the intervening years potentially resulting in an enhanced income from age 80.

How insurers can offer CDC

Current position for insurers

The Defined Contribution (DC) part of UK pension provision has grown strongly in recent years, driven in the main by Auto Enrolment legislation. DC Schemes are regulated by either The Pensions Regulator (TPR) for trust-based schemes, or the Financial Conduct Authority (FCA) for contract-based schemes (Insurers are also regulated by the Prudential Regulation Authority (PRA)).

UK Insurers are capable of providing both trust-based and contract-based schemes, and many in fact do this. This heritage and current market activity in both forms of DC pension provision gives them a unique overview of the DC environment, as well as the experience of working with different regulators dependant on the plan chosen by a DC client.

This experience and knowledge extends beyond the accumulation stage of DC pensions. Insurers have been delivering decumulation products and solutions to both the corporate and individual markets for many years, ranging from annuities (whole of life, fixed term, unit-linked, with-profits) to various forms of Income Drawdown (ID) as well as hybrid solutions utilising both annuities and ID.

Beyond administrative and investment services to DC clients, many insurers have invested heavily in education/financial wellness services for clients/scheme members, and this has not only helped clients/members understand their finances, it has also given insurers a strong insight into member needs and requirements, helping them to further develop their product and service offerings in the market.

Regulators have moved to two areas following the success of Auto-Enrolment in DC pensions: value for money, and provision of income in retirement.

Although there are different regulators for trust-based schemes and contract-based schemes, the two areas are showing increasing signs that future regulatory activity will at least attempt to incorporate a "level playing field" to ensure that a member of any kind of DC scheme will have the same or similar protections.

The 2022 update from the FCA on their working relationship with the DWP/TPR (Regulating pensions and retirement income: FCA/TPR regulatory strategy update) listed several areas in which they would be working together, including productive finance, value for money, regulatory framework for effective stewardship and supporting consumer decision-making.

As well as this, TPR and FCA in 2021 jointly issued a discussion paper on introducing a framework for assessing Value for Money in DC pension schemes.

That being said, there are still regulatory and legal issues facing insurers entering the Collective Defined Contribution (CDC) market in terms of ensuring a level playing field between insurers and non-insurers, such as:

- Would legislation/regulation be changed in time for any CDC launch to permit this level playing field, in particular the position regarding capital/buffers, so that insurers were not at a commercial disadvantage?
- What will be the impact of the recent introduction by the FCA of Consumer Duty? There is no matching regulation from TPR currently. Data on insurance company costs are not available for commercial reasons; however Fitch has commented that the introduction of Consumer Duty is unlikely to make the UK life market more competitive. It believes that "the need to show fair value to customers while maintaining profitability adds to the pressure for insurers to push ahead with cost-cutting, digitalisation and platform creation" (Fitchwire August 2023).

Whole of life or decumulation only CDC

The only CDC scheme being set up under specific legislation is a whole of life CDC for Royal Mail; however, DWP is clear in its aims for Decumulation CDC. In its July 2023 "Helping Savers Understand their Pension Choices" paper it stated that "We also know that many members of occupational schemes want a regular income from their pension assets. We are therefore encouraging inclusion of access to a CDC within the framework and want to create a CDC Decumulation market that supports this approach."

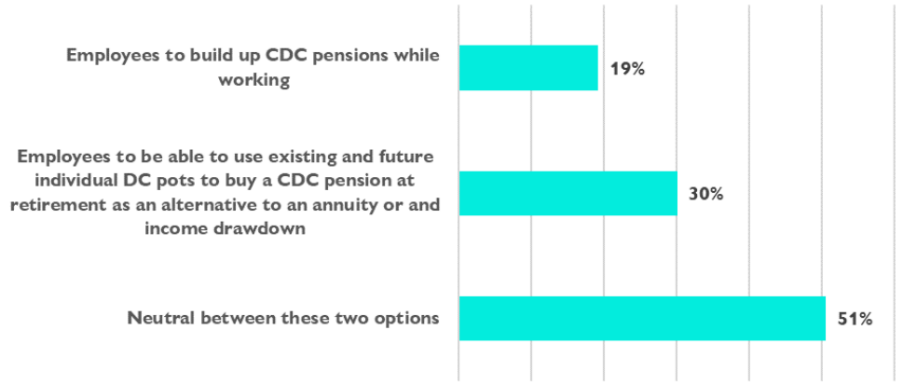
Provision of retirement income from DC plans is being considered in many countries. In Germany for example, decumulation only CDC is being introduced in the form of DC plans which must result in a variable life annuity adjusted according to the scheme funding position (The Pensions Policy Institute (PPI) Report on "What is CDC and How may it work in the UK?" 2018). Innovation in Australia has resulted in the launch of options like longevity pooling.

The 2018 PPI Report made the following points on decumulation only CDC:

- Reduces a CDC's ability to smooth returns effectively.
- It would reduce issues of intergenerational fairness as risk would only be shared between retirees.
- It would mean a CDC scheme would be less able to invest in higher risk and illiquid assets and is therefore more likely to achieve similar returns to a well invested drawdown account.
- A CDC Scheme would not be able to spread lower than expected returns across a broad member base and so retirees would be more likely to experience reduced indexation and potentially nominal cuts to pensions in payment as risk is shared amongst a smaller group.
- It may be preferable to an annuity as not subject to the same regulatory requirements and therefore should be able to invest in return seeking assets throughout the retirement period to a greater degree.

Research released by the Royal Society for the Arts "Next Steps For CDC Pensions in the UK" (July 2021) shows that of those who expressed a view, a larger proportion favoured a decumulation only CDC option.

Fig. 8 - Preferences for CDC Design 2: If your organisation (or one you are connected with) was to provide CDC pensions, would there be a preference for any of the following?



However, there are issues to be addressed relating to decumulation only CDC schemes, which has led to the following comments:

- "….commercial considerations for decumulation only schemes will need to be thought through separately", Steven Taylor, Partner, LCP, and
- "We are disappointed that decumulation only CDC appears to be kicked further into touch- although we accept that further work is needed to establish how this commercial market will work" Madalena Cain, Associate Partner and CDC Specialist, Aon. Both quotes from Professional Pensions, July 2023.

Trust-based or contract-based DC pensions

One of the key differences between the two forms of DC plans at retirement is that the contract-based market has the "Investment Pathway" structure open to retirees, as introduced by the FCA.

The 4 options are:

- **Investment Pathway option 1:** I have no plans to touch my money in the next 5 years
- **Investment Pathway option 2:** I plan to use my money to set up a guaranteed income (annuity) within the next 5 years
- **Investment Pathway option 3:** I plan to start taking my money as a long-term income within the next 5 years
- **Investment Pathway option 4:** I plan to take out all my money within the next 5 years

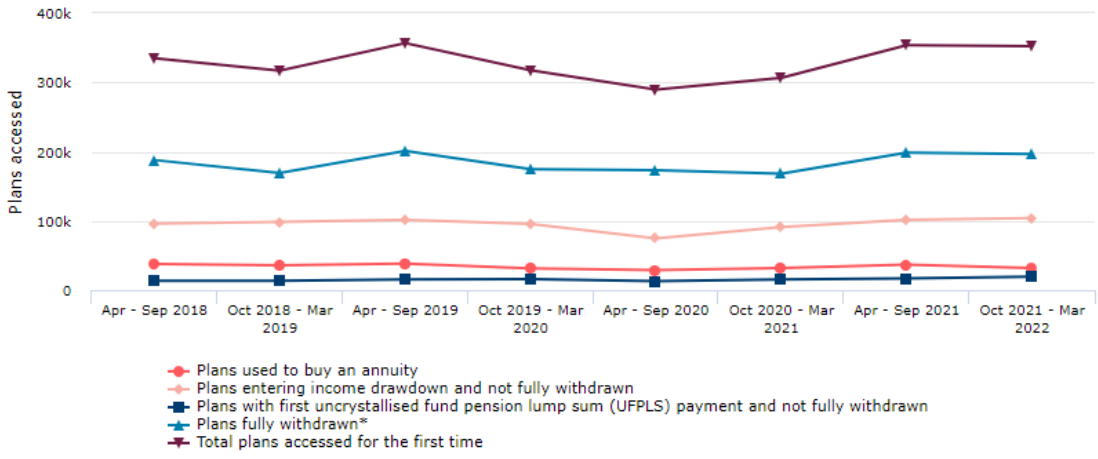
In terms of the success of Investment Pathways in contract-based plans, the 2023 DWP consultation "Helping savers understand their pension choices" quoted that some respondents to their previous consultation "noted that around half their customers were using Investment Pathways. The most popular pathways were Option 1 and Option 4."

In the FCA's July 2023 Investment Pathways: post implementation review , they found that Investment Pathways were working as intended, and proposed no changes at this stage. However, it has been suggested that CDC could be added as a fifth Investment Pathway to facilitate CDC being made available to contract-based scheme members, although proponents of CDC have suggested this may not enable CDC to achieve scale as a 1-in-5 choice.

Figure 1 below, from the FCA, confirms the low demand for annuities also reflected in the DWP consultation. The DWP has been consulting on options like CDC to deliver income in retirement, and this data may be influencing the DWP in its thinking over the provision of retirement income to those who either aren't going to cash in their whole fund, or don't need to access this part of their retirement income for some years.

Figure 1: Number of pension plans accessed for the first time by method of access

Source: FCA retirement income data



*By plan holders accessing their plans for the first time via small pot lump sum, drawdown or UFPLS.

Leveraging insurance company expertise

In the July 2023 DWP Government Response on Extending the Opportunities for CDC Pension Schemes, it is noticeable that the DWP signalled that it will be liaising with the FCA on the following areas:

- Underwriting
- Financial promotions
- CDC in contract-based schemes and regulating decumulation
- Capital requirements

This highlights the knowledge and experience that those regulated by the FCA/PRA have in relation to setting up and running a structure like CDC, something other DC market participants are unlikely to have in-house, in terms of either staff or systems. In particular, clear and unambiguous communications to potential members on the possibility of cuts in benefits or rises in contribution rates will be required, as well as clarity on intergenerational fairness and how this is dealt with in the scheme.

It is still unclear how the initial funding of CDC schemes would be managed. This may be complicated by the launch of multi- employer CDC schemes if, as expected, employers will be allowed to contribute to the set up costs.

The PPI Paper "Modelling Collective Defined Contribution Schemes" (2015) shows outcomes under two assumptions: firstly that initial funding costs have been covered, and secondly when no initial funding is available. This modelling clearly illustrated that without initial pre-funding the benefits under a "CDC scheme are similar to that of a DC scheme with an aggressive drawdown (7% per year). However, the modelled CDC scheme would be less likely to run out, and the outcomes are still higher than a DC scheme with an annuity."

A similar issue relates to the potential use of reserve buffers (money held back to reduce the risk of having to reduce pensions in the future) in CDC schemes.

- At start up, are new entrants contributing more to a buffer than members joining later?
- If the buffer has been used to smooth returns and needs replenishing, will new members post that point in time have more of their premiums allocated to it?
- Would the presence of a buffer possibly change members' perception of the scheme benefits from a target or ambition towards an implied guarantee?

The issue raised by the potential use of reserve buffers is directly related to intergenerational fairness, and here a life insurer's heritage in with-profits business can help in the design and structuring of a CDC scheme to help manage this issue.
Views differ on whether buffers are appropriate in CDC Schemes for example, in The Government Response to Delivering CDC Pension Schemes Consultation in March 2019:

- "103. The decision not to require a capital buffer opened up a great deal of debate. Although the majority supported our approach, a considerable number of respondents felt very strongly that CDC schemes need to operate with capital buffers, and that our approach is too open to risk."

Although there are varying views on the scale required to ensure a CDC scheme has the assets required to meet its objectives, most agree that only the largest single employers could run a CDC scheme, along with the largest Master Trusts and insurers. Given the options being discussed by the DWP on the ability of smaller DC schemes to utilise partnerships to deliver appropriate retirement options to members, insurers with their brand, financial stability and distribution networks are well placed should they wish to launch a CDC plan and use partnerships to gain scale more quickly.

In addition, with insurers' books of contract based schemes, if legislation and regulations permitted, CDC could be made available to contract-based scheme members, again helping to build scale more quickly.

CDC scheme design and issues facing insurers

Insurers face the additional challenge for gaining scale of the design and marketing of a CDC scheme. While this is important for schemes from single employers, this being the scheme on offer for employees easily creates scale, while insurers would need to design a scheme that is both appealing to the market (to attract sufficient sales), while also allowing a design that realises the key benefits quoted for CDC – in particular excess returns above other retirement income products.

As one example of such a challenging design feature, in light of pension freedoms, allowing transfers out of the scheme may be seen as a desirable feature to allow flexibility to consumers (or indeed this option may be required). There would need to be a methodology for calculating a fair transfer value, which becomes more challenging in a collective/pooled risk space as each policyholder doesn't have their own 'pot'. While insurers will have experience of valuing this (e.g. prospective valuation seen for calculating surrender values on with-profits whole of life blocks where asset shares are no longer viable), the calculation is not a simple one. As the value is not formulaic, i.e. it will be subject to assumptions recommended by an actuary, it would be harder to explain to policyholders, perhaps conflicting with the desire for transparency.

Experience over the past couple of years with prospective valuations has also shown that surrender/transfer values can be quite volatile depending on the approach taken. For example, recent significant interest rate rises led to higher payouts on contractual claims (deaths and maturities) through better future expected returns, but the additional discounting reduced surrender values quite significantly. Consideration would need to be given to expected volatility of transfer values and how this is communicated with customers, particularly if "current" transfer values were to be quoted in annual statements.

In addition, the pooling of risks means one of the sources of expected excess returns above DC is, in effect, credit for other members not living as long. Therefore, transfers out can create an anti-selection effect, dampening returns for remaining members. While this is true to some extent for with-profits policies (as a policyholder could elect to exit while transfer values are high relative to asset values owing to smoothing), the effect may be more acute with CDC as there is no death benefit and transfers out may be more heavily weighted to those in ill-health who expect to receive higher income and/or leave a remaining lump sum to beneficiaries through alternatives to CDC. While insurers will have extensive experience of determining fair surrender values and allowing for anti-selection in assumption setting, these assumptions will initially be based heavily on expert judgement and if the balance is not struck right there is a risk of over-promising excess returns or reducing marketability.

Consumer Duty introduces the idea of 'appropriate friction' for key decisions made by policyholders, and this would need to be considered carefully if a transfer were requested. The financial objectives of a retiree are likely to still include having an income for life, and so it may be appropriate to discuss with the FCA what an appropriate level of friction may be for allowing a policyholder to transfer out of a product that provides an income for life, i.e. to make sure this is clearly explained. It is not clear at this stage how far the FCA may expect firms to go to ensure customers have the facts they need to make a decision (although noting they do not have to guarantee that the policyholder makes the 'right' decision).

While transfer values are just one area of scheme design consideration, this highlights the complexities for CDC for transparency, marketability and profitability, and is just one of many areas that would need to be considered by insurers before entering this market.

Other issues facing insurers

Other issues facing insurers entering this market include:

- Most DC platforms/systems have been built to utilise daily priced funds, to enable daily matching of incoming premiums and to enable member online access to their fund value. It is highly likely that CDC schemes would not issue daily prices, so could have potential systems issues, and communications to members regarding removal of access to fund values on a daily basis.

- Financial promotions for CDC would have to be very precise given the complexity of CDC and following the previous experience with the marketing of low cost endowments, where customers expected that the endowment was guaranteed to pay off their mortgage at the end of the term. The Financial Services Authority (in 2006) believed that 2.2 million households faced a shortfall, with an average £7,200 shortfall.

- Engagement with the regulators on what 'good' marketing material looks like will be essential. It will be difficult to accurately show the benefits of CDC (as there is a risk of over-promising), but it will be equally difficult to communicate the risks without making the product seem unappealing relative to other options on the market. For example, when comparing against current annuity rates, which provide a guaranteed level of income for life (unlike CDC providing a targeted but unknown income for life), it may be difficult to convey the better expected income from CDC without over-promising. Again there are parallels with marketing with-profits products in this balance (where a range of outcomes is necessary to communicate), although the lack of any guarantees for CDC may make this even more challenging to market successfully.

- Furthermore, consumers have been educated on their responsibility for their financial decisions for a number of years now, with Consumer Duty being focussed on empowering consumers to make their own financial decisions. While CDC isn't necessarily at odds with this, it is a reasonably large shift to take investment and income decisions away from consumers, all the while leaving them to retain the risk. To invest retirement savings in this way will require trust, which insurers may (in most cases) have a competitive advantage in with their long-standing brands. However, this will likely require additional governance, documentation and regulatory oversight to ensure insurers can prove that they are acting in the best interests of the scheme members/customers when the insurer themselves would not bear the income risk to the customer of things going wrong (though they will bear some risk in the form of lost fees linked to assets under management).

- Consumers may be wary of the use of discretion in determining benefits, equating this product too heavily with now rarely sold with-profits. Benefits and decisions could be more formulaic, but experience from managing with-profits business is that formulaic doesn't necessarily result in fair (or now under Consumer Duty, good) outcomes for customers. Furthermore, the expertise in insurance companies for managing discretionary elements may be a key marketing benefit over other companies, and so being too formulaic would reduce this competitive advantage.

- Further, the investments held within the fund will need to be chosen and articulated clearly for members. On one hand there is a view that CDC funds will be able to hold more risk-based assets for longer than comparable DC vehicles; on the other hand, there is discussion regarding how the size of CDC funds will enable the use of structures like Liability Driven Investment (LDI), longevity swaps and buy-ins to help manage the liabilities accruing. Having to explain the possible use of these may make any financial promotions lengthier and potentially more complex for potential members to understand. It is also possible that in a contract-based market the investment profile could be more tailored to groups of customers, but any segmentation would reduce the collective nature of the product.

Regulatory challenges

Under the PRA Rulebook (Investments, 2.1(3)), insurers have a general obligations to "ensure that the investment of assets is made in the best interests of policyholders". As noted on the previous slide, insurers will be incentivised to do so given the impact on their fees for asset management, but it will be important to implement (or utilise existing) governance structures that achieve this obligation in a demonstrable way for a CDC Scheme. For example, for with-profits business, investment principles and practices are documented for policyholders in a PPFM, with With-Profits Committee oversight to ensure the strategy is appropriate for the risks of the fund and policyholder expectations. Information on current investments and performance are also published on company websites. Similar structures and associated costs would need to be considered.

There would need to be engagement with the PRA on capital requirements, as the capital position of CDC schemes is (yet) undecided. Considering the parallels with with-profits funds, these can reduce capital requirements by making allowance for management actions, i.e. where future discretionary benefits can absorb adverse experience. If the size of future discretionary benefits allows it, some (typically smaller) with-profits fund reduce capital requirements entirely, other than allowance for Operational risk. Larger with-profits funds, and in particular those with more sophisticated modelling of capital requirements (e.g. Internal Model firms) may model management actions in more detail, typically with a tiered approach of management actions that may be taken in adverse scenarios. Typical management actions would be moving to less risky assets, cutting bonus rates (annual or terminal), breaking smoothing limits, etc. The allowance for management actions will therefore reduce capital requirements, but the more sophisticated approach will consider the time required to make the adjustments and the realistic adjustments that would be made in one go.

For CDC, as there are no guarantees, theoretically the SCR could be absorbed entirely. Unlike for with-profits policies with some form of guaranteed benefits that would be accounted for in capital requirements with the scale and timing of management actions in adverse scenarios, even if actions would be implemented over time in a CDC scheme, the shocks could always be absorbed further. However, as it is expected that only larger insurers would be in a position to offer CDC schemes, these are likely those with Internal Models and so engagement with the PRA would be needed to understand the expectations for approach to determining capital requirements.

The impact of any capital requirements on benefits, similar to set up costs and the impact of including reserve buffers to manage potential cuts to benefits, would need to be considered in Scheme design.

Further, discussions with the PRA may be required to understand alignment of CDC with its objectives and if this creates opportunities or barriers, e.g.:

- Does provision of a non-guaranteed CDC product by an insurer align with the PRA's objective of contributing to securing an appropriate degree of protection for insurance policyholders? There is potential that the CDC ambition may be viewed as an implicit guarantee, which could reduce the attractiveness to an insurer of offering the product, as well as the diluting the potential benefits for customers (while given them more security).
- How would the PRA's regulation of contract-based CDC help to facilitate effective competition between firms, particular if non-PRA-regulated firms enter the market? Could the PRA ensure a level playing field from a regulatory standpoint.

Summary of key points for insurers to consider

In summary, insurers are well placed to offer CDC, with insurers being capable of providing both trust-based and contract-based schemes. This experience and knowledge extends beyond the accumulation stage of DC pensions. Insurers have been delivering decumulation products and solutions to both the corporate and individual markets for many years, and one may argue that retirement income sits more naturally with insurers than with a (then-former) employer.

Insurers have the following key advantages for offering CDC:

- Having offered similar products, insurers should have the existing capabilities in terms of modelling/administration systems, governance structures and in-house expertise to design, launch and run CDC without starting from scratch. While currently many aspects of CDC are unclear (including from the regulatory standpoint), knowledge within insurers should make them well-placed to navigate challenges with initial design and marketing.
- Giving up retirement savings to a company, particularly where the consumer retains the risk while having no say in the running of those funds (other than selection of company to invest with) will require a great deal of consumer trust. Many insurers are household names and have a proven track record for managing customers finances securely.
- Insurers have scale in their existing book to sell decumulation products and services (as they do already), but they also have a distribution advantage in their network of supporting IFAs serviced by a sales force and relationship managers. This also further extends with those who have direct client bases.

However, there are also risks facing insurers in offering CDC that would need to be considered carefully:

- On balance with the listed advantages, insurers may find it challenging to achieve the required/desired scale for Value for Money in a CDC Scheme, relative to e.g. a single employer offering a scheme to all employees. Insurers would be dependent on an attractive CDC Scheme design relative to other retirement products available in the market, and so design and marketing would be key to success. Care would need to be taken to ensure any CDC product is marketed appropriately to avoid overpromising/mis-selling.
- A CDC product may be at odds with what consumers have come to expect with recent trends and pension freedoms, e.g. no ready access to current value, no responsibility for financial decisions while retaining the risk, lack of transparency given discretionary elements, etc. Appetite for the product in the market would therefore need to be assessed carefully.
- The overall insurer cost base compared with that of Master Trusts (e.g. additional costs for marketing/financial promotion, Consumer Duty if contract-based, etc.) may make a “level playing field” more challenging in relation to both start up and ongoing costs.
- As has been seen in the Netherlands, CDC can present actual or perceived issues with cross-subsidies and transparency, making it more difficult to justify a fair design between different generations of customers in a CDC Scheme. However, the pooling of risks is one of the key features of the product (and a source of additional returns) and so this would need to be carefully managed in design, implementation and management of a Scheme.
- There is potential for reputational damage and additional costs of restructure if initial/existing CDC proposals were deemed to be not working properly (and requiring changes, as has happened in The Netherlands).
- Regulatory views on CDC are as yet unclear, and these could facilitate or hinder insurers entering this market.

CDC in the Netherlands

CDC in the Netherlands – origins and plan structure

Origins of Dutch CDC

Stemmed from the implementation of IAS19 in 2005, in particular:

- IAS19 revealed large corporate balance sheet liabilities, which were difficult to manage
- IAS19 revealed significant corporate pension risks related to these plans
- Companies searched for ways to eleminate these risks and liabilities:

⇒ Around 2010: Development of CDC-plans for pension funds

⇒ Around 2012: Development of IFRS-proof plans for insured plans

The main intention was to enable recognition of the plan as a DC-plan for the company, while maintaining, as much as possible, the defined benefit structure for the participants. In CDC-plans, all pension risks were transferred away from the company to the participants, and in IFRS-proof plans to the insurance company. CDC was not intended primarily to increase expected benefits by pooling assets.

Main structure of CDC plans (pension funds)

Generally contributions are a fixed % of pensionable pay paid by the company to the pension fund. This equally applies to corporate pension funds and industry-wide pension funds.

Members receive a conditional accrual of future service benefits, based on a career average benefit formula. The annual accrual depends on the agreed contributions and the unit cost of the benefits at a given point in time (e.g., each year based on the market situation on January 1).

Members receive a conditional increase of past service benefits, based on the available assets in the fund. Insufficient assets could also lead to benefit cuts.

Contributions must be set with the intention of financing future accruals only. Given a certain accrual rate, the contribution rate must be reviewed no less frequently than every 5 years.

Schemes administrated by industry wide pension funds were not affected by the introduction of IAS19. These schemes could already be recognized as DC schemes.

Main structure of IFRS-proof plans (insurance companies)

These are career average benefit plans where the contributions by the company represent the actuarial cost of the annual accrual, including all related additional costs (for guarantees, administration and asset management).

The accrual of future service benefits is unconditional. The premium is not fixed and fully related to the costs of future benefits.

The increase of past service benefits is conditional (if applicable at all). Past service benefits are fully guaranteed by the insurer (no benefit cuts). No further contributions by the company for guarantees or fees related to past service benefits.

Insurers started to offer these plans to avoid loss of business (avoid replacement of plans by individual DC plans or transfer of plans to industry wide pension plans due to IAS19 implementation). These plans generally do not distinguish allocated assets.

Having set out the background, we will now focus on the Dutch CDC pension plans, as administrated by Dutch pension funds as most relevant to likely developments in the UK.

CDC in the Netherlands – pension risks

Pension risks

CDC plans for corporates administered by company pension funds face a number of risks and issues as described below.

These plans transfer pension-related corporate balance sheet risks to the plan participants. The pension risks are shared collectively by the plan participants with a dowry (one-off) payment made by the company to the pension fund to compensate the plan participants for the risk transfer.

Compared with the situation before the transition to CDC:

- Pension funds have tended to pursue more prudent investment policies, due to the absence of the company as back-up if there are insufficient assets.
- Benefits have tended to be lower, either in the form of expected benefits, lower indexation or even benefit cuts.
- Pension premium are required to be adequate, including surcharges, to avoid a cut of future accrual as much as possible.
- The priority method/policy, in the case of there being insufficient assets, is important to formally determine very clearly in advance . For example, if full indexation cannot be granted it must be clear if constraints are applied equally across all plan participants or differently say to active or inactive participants.
- Finally, the higher risks to the plan participants may also have resulted in a stricter regulatory context.

CDC in the Netherlands – challenges for plan administrators

Pension fund as administrator

Investment policy:

- The investment risks are fully borne by the collective participants with no risk to the sponsoring company.
- The risk preferences of the collective participants are the guiding factor for the pension fund board in advance of setting the investment policy. This comprises investment risk and requires identification of the participants' risk preferences by risk preference research (generally based on questionnaires sent to the participants, and resulting in different risk preferences for different age categories).
- Given the absence of risks to the company, the company would also be more at a 'distance' with a CDC plan as there is less need for its direct involvement. In view of this, discussions arose about the appropriate role of the company in the pension fund board.

Prioritising benefit increases:

- If contributions / available assets are insufficient to allow for a full increase in line with the benefit formula, then schemes must determine how, in what order and to what extent this would this impact: the risk benefits, the accrual of benefits, and the accrued benefits.
- This has resulted in more focus on solidarity (cross-subsidies) between different groups of plan participants to be determined by the social partners e.g. employer, trade unions.

In the case of expected insufficient contributions for full accrual:

- Social partners started suggesting ways to the pension fund board to lower the unit price of defined benefits, e.g. by questioning the underlying actuarial assumptions (e.g., suggesting higher discount rates). This made it very important for pension fund boards and the actuaries to explain the pricing policy of the fund and to make sure that the unit price continues to cover the actual cost of the benefits (including all related surcharges) and that the unit prices remains compliant with the regulatory framework.
- As part of the plan a clear ranking method must be set out to determine how accruals are reduced (elements to consider include: administration fees, risk benefits, accrual of old age pension, accrual of spouse's pension).

CDC in the Netherlands – challenges for plan administrators (cont.)

Pension fund as administrator

In the case of insufficient assets and/or asset returns to permit full indexation, benefits may be subject to incomplete indexation or reduction:

- Also here, the social partners started suggesting ways to the pension fund board to lower the value of the liabilities (and, consequently, to increase the funding ratio) by questioning the underlying actuarial assumptions. A higher funding ratio may enable the pension fund to limit incomplete indexation (or avoid benefit cuts). Also for this part, it became very important for pension fund boards and the actuaries to explain the fund's valuation policy. Obviously the valuation should remain compliant with the valuation rules set out by the regulator.

- As part of the plan, a clear ranking method must be set out to determine how incomplete indexation (or benefit cuts) are to be applied (e.g. equal reduction of indexation for all benefits, or indexation of actives first, then indexation for inactives). The ranking method can vary between plans.

In practice, we see that Corporate pension funds are generally well funded (e.g. due to the dowry). We are not aware of benefit cuts in CDC-plans (corporate). (Note: for industry-wide pension funds, the funding (including the contributions) was generally insufficient and benefit cuts did actually occur. This was also caused by low interest rates which resulted in insufficiently high funding ratios. Benefits cuts and incomplete indexation caused dissatisfaction among participants involved).

CDC in the Netherlands – recent developments

Introduction of new Dutch pension law (Future Pension Act) as of July 1, 2023

On July 1, 2023 new Pension law became applicable. Main reasons:

- Low discount rates resulted in high pension cost (for employers), low indexation and even benefit cuts (current and former employees; unions).
- The existing system appeared unable to provide the "promised" benefits (during a longer period of no or less indexation), reducing trust in the current pension system.
- The existing system lacked transparency. The contributions for young participants subsidize the accruals for older participants (substantial "solidarity" or cross-subsidies).
- The existing system appeared to impede the flexibility of the labour market.

Pension funds:
In most cases, pension funds will have to convert past service defined benefits (including past service CDC-benefits) into **collectively managed**, but **individually allocated** assets.

- Future accrual of defined benefits will be prohibited. Future benefits will have to be based on defined contributions to the individually allocated, but collectively managed, investments.

- A clear distinction will be required between the situation before retirement (accumulation phase) and the situation after retirement (pay-out phase). "Solidarity" is possible within a phase but not between these phases. Important implication: investment returns on assets for benefit in the accumulation phase cannot be used for benefit increases in the pay-out phase. For each phase, the risk preferences of the collective participants and resulting asset pooling should be clear and the investment policy should be (and remain) in line with these preferences. Risk Preference Research is an obligation to determine the risk profile of the participants.

- Points of attention: balanced treatment of all participants, e.g. balanced allocation of investment revenue, administration costs and asset management costs; balanced allocation of longevity risks. As a result, there will be a significant reduction, but not full removal, of solidarity.

- Communication issues regarding the development of the increase / decrease of the individually allocated assets (what elements should be distinguished (investment, costs, risk capital?) and how often should the participant be informed (annually, monthly, daily, real time?)

- All CDC plans have to be transferred into the new pension system, as well as the accrued benefits as a default.

- 'Fairness': measure to what extent the decision to share asset surpluses between groups of participants is fair.

CDC in the Netherlands – in summary

- Dutch CDC plans originated from a desire to remove pension-related corporate balance sheet risks.
- Dutch CDC plans did not originate out of a desire to pool assets to increase expected investment revenues.
- CDC plans apply to corporate pension funds. For insured benefits there are the so-called IFRS-proof plans.
- Impact on pension funds that became CDC pension funds was significant: risks were fully transferred to the plan participants and no longer shared with the employer. This resulted in:
- a more prudent investment policy with lower expected return on assets and
  - questions about the management structure of the fund
  - and more focus on solidarity between different groups of plan participants determined by the pension fund board
- Some of the issues faced by Dutch CDC (pension fund) plans may also be faced by UK plans (lessons learned), such as:
  - Determination of a risk profile of the fund that fits with the risk profile of participants, e.g., by using questionnaires. Different profiles may apply for different age categories, as well as for participants in the accumulation phase and participants in the pay-out phase. Make sure that for each phase, the risk preferences of the collective participants and resulting asset pooling is clear and that the investment policy is (and remains) in line with these preferences.
- By continued pooling of assets in the CDC-plans corporates could maintain the benefits of such pooling and avoid the possible negative effects of IDC plan investments where participants can be exposed to the full effects of investment market volatility and in response possibly adopt a more conservative investment strategy with lower expected returns overall.
- Determination of the method to allocate contributions, assets and (net) return on assets to the participants (and to periods by using buffers). Buffers imply solidarity. Make sure this solidarity is in line with the individualisation of the society. Under new Dutch law there is a hard line between return on assets for benefits before the pay-out phase and return on assets in the pay-out phase.
- In order to manage the expectations of participants and in order to comply to the duty of care of the administrator it's essential to make sure that the result of the asset pooling is translated in clear allocation guidelines and properly communicated with the involved participants.
- Communication with the participants about (incomplete) accrual, (incomplete) indexation of benefits or even benefit cuts is crucial. Make sure participants are aware of the risks and the expected results under "bad weather", "good weather" and baseline. Make sure the level of solidarity is clear and general acceptable by the participants.

Historical back-testing

Design

Investment Scenario
We have back-tested the model by assuming that investment returns for the next 50 years will be the same as those experienced between 1973 and 2023. This does not make any allowance for mortality improvements above those assumed in our base scenario, so only reflects the impact of this particular investment scenario.

We have created historical returns as follows:

- Gilts – returns for fixed interest and index-linked gilts are based on FTSE data between 1999 and 2023. For earlier periods we have used returns set out in Barclays' annual Equity Gilt study, which gives returns for the period between 1973 and 1999.
- Equities – returns in line with FTSE All Share returns between 1985 and 2023, with earlier returns between 1973 and 1985 based on the derived gilt return plus an average equity risk premium over the period from 1985 to 2023.
- Credit – returns in line with the iBoxx All Stocks index between 1998 to 2023, with earlier returns between 1973 and 1998 based on the derived gilt return plus an average credit spread over period from 1998 to 2023.
- Diversified Growth / Multi-asset Credit – assumed in line with equity returns.
- Cash – returns in line with the Bank of England base rate.

Gilt spot rates are based on Bank of England curves. Although these do not go back to 1973, we only consider results for a 40 year-old member and so only rates from 2000 are relevant (i.e., when that member reaches retirement age).

There are clearly several approximations in setting this return profile, and a wide range of other methods could be considered appropriate.

Model Design and Metrics
We have focused on the 40-year-old model point on the whole-of-life models.

We have run the base case model designs for CDC and IDC under this investment scenario, as set out on page 19 (and in more detail in Appendices 1 & 3). For IDC, we have only run the drawdown then annuity (at age 80) and annuity only (at age 67) models.

We have calculated the same results metrics as described on page 20.

Other Assumptions
For asset allocation, mortality, annuity pricing and expense assumptions, these are consistent with those used in the whole-of-life models, and as set out in Appendix 4.

Results

Age 40

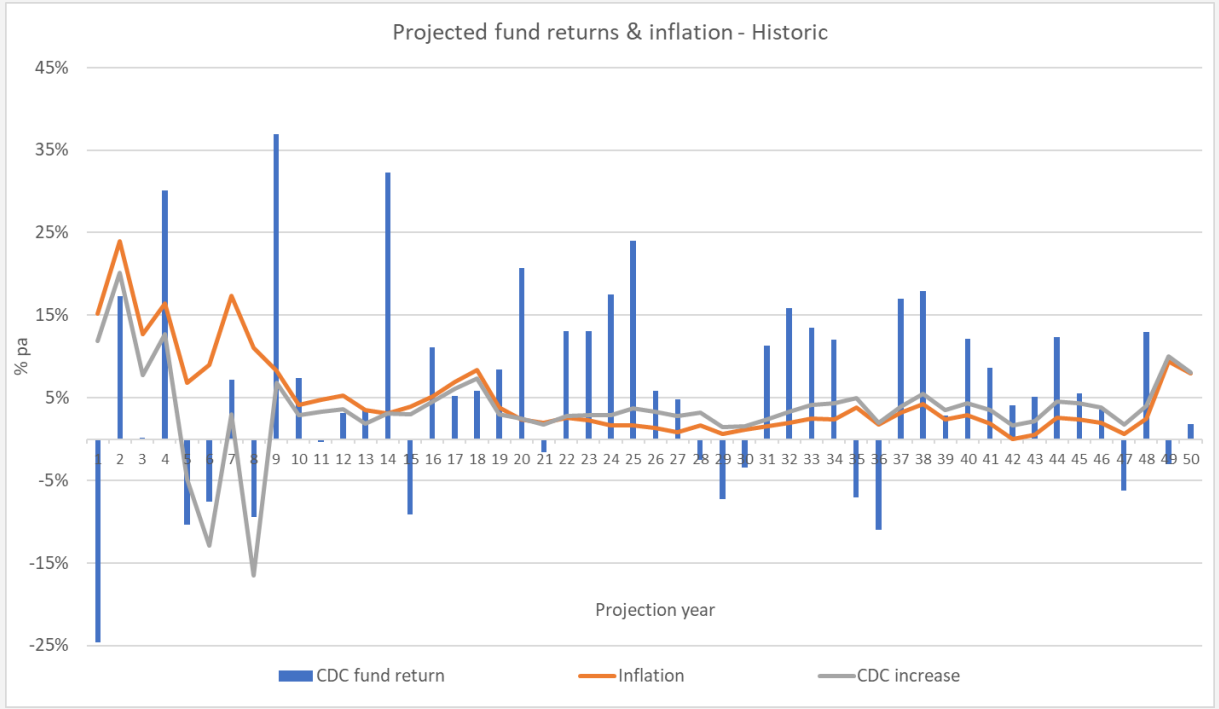
Survival age	Average replacement ratio		
	CDC	IDC – DD then Annuity	IDC – Annuity only
75	22%	38%	34%
80	23%	38%	34%
90	25%	28%	34%

Survival age	Internal rate of return		
	CDC	IDC – DD then Annuity	IDC – Annuity only
75	-0.8%	7.1%	2.3%
80	2.9%	7.4%	5.3%
90	5.7%	7.1%	7.4%

Comments

Our historical scenario begins in 1973, the year of the oil shock, and the early period exhibits high inflation and volatile investment returns. These represent difficult conditions for all schemes but for IDC the negative impact is lower than for CDC as the amount of funds exposed in the early stages of accumulation is relatively low.

For an IDC member aged 40 at outset, the maintained exposure to largely growth assets through the rest of the accumulation period allows a reasonable recovery from the poor returns in the early years, such that they can achieve a good income in retirement (relative to salary before retirement).



For the CDC Scheme, the stressed starting year and other years of negative returns early on would lead to a number of significant benefit cuts during the first 10 years – as shown by the chart above. Investment returns on the CDC fund in subsequent years (both up to and after retirement) are not sufficient to fully reverse the impact of the earlier benefit cuts as in most years the CDC increases do not even keep up with inflation.

Thus, we see the IDC arrangement would perform considerably better than CDC based on the returns seen over this particular historical period. A different historical period would show different outcomes.

Appendices

Appendix 1: CDC model design (whole-of-life)

Product design

The CDC scheme we have modelled is based on the following:

- Normal Retirement Age of 67
- Target pension accruing at 1/100th of salary in each year.
- Target pension increase before and after retirement in line with inflation.
- Total contributions are paid on an age-related structure as follows:

Age range	Total contribution rate
Up to age 40	9%
Age 40 to 49	11%
Age 50 to 59	13%
Age 60 and over	15%

- Once each year of benefit is accrued, actual pension increases are applied each year (i.e. past accrued benefits are not linked to salary).
- Actual pension increase each year is calculated at each valuation based on the level of increase relative to inflation that can be paid in that year and each future year such that the liability value equals the value of the assets at the valuation date.
- If future projected increases would be negative, then these are capped at zero and a benefit reduction is applied in the current year such that the liability value equals the value of the assets at the valuation date.

- No spouse pension is payable on death
  - In practice we would expect the majority of CDC arrangements to offer a spouse pension, but for better comparison with IDC we believe it makes more sense to ignore the spouse pension in the core scenario, as this offers a better basis for comparison against drawdown.

Increase/reduction mechanism

In this model a key component of the design is how pensions increase, and how they are potentially reduced, in order to balance the funding position each year.

The target is to increase pensions in line with inflation in each year (what inflation means for the purpose of this model is discussed further below). The actual increase will be set at a level relative to inflation such that future increases at this level are funded for. This reflects both the current level of inflation (used to set the current increase) and long-term inflation expectations (used to value future increases).

For example, if inflation in the current year is 4% and long-term inflation expectations are 3% pa, a 7% increase in the current year would mean projected future increases of 6% pa – both 1% above inflation.

A simplistic application of this mechanism does mean that an increase in the current year could in theory be negative whilst allowing for future projected (positive) increases, e.g. if inflation is low in the current year compared to long-term expectations. We believe this would be a difficult concept to explain to members, and as such our model reduces the future projected increases to allow the current year increase to be nil in this case. A benefit reduction is only applied if future projected increases are reduced to zero because they cannot be funded, i.e. the model does not allow future benefit reductions to be priced in.

This means that benefits are only reduced when there is no other option to balance the asset and liabilities.

Appendix 1: CDC model approach

Population

In the core scenario, our model is built on a population of 9,000 members between the ages of 30 and 89, with 150 individuals in each age cohort. Those at age 67 or older are pensioners and those under 67 are active members.

Each age cohort is split 50% male and 50% female and further into 3 income bands with salaries £15,000 (Low 20%), £30,000 (Middle 60%) and £60,000 (High 20%).

It is assumed that all members have been in the scheme since the age of 30 and the accrual to date or pension in payment (respectively for active and pensioner members) broadly reflects accrual over the relevant period with increases granted in line with the target inflation increase.

This sample population is designed to reflect the membership of a typical, mature CDC arrangement, although in practice we may see:

- Populations that are more homogenous, e.g. industry-wide schemes would be heavily weighted towards employees typical of that industry.
- Populations with more variability, e.g. particularly high or low earners.

In our build-up scenario, the starting population is restricted to 4950 members aged 30 to 62, with the same split of sex and income band within each cohort as above. It is assumed that all members join the scheme at the projection start date and have no past accrued benefits.

Membership experience

- All members are assumed to retire at age 67.
- In each future year, a new cohort of members age 30 join the scheme and start accruing benefits - effectively replacing the cohort aged 67 who have retired.
  - This means that the active population is assumed to remain stable over time in the core scenario. In the build-up scenario, a stable active population is reached after 5 years.
- We have made no explicit allowance for withdrawals prior to retirement (either in the past or future), i.e. we effectively assume that early withdrawals are immediately replaced by another member of the same age and salary.
  - In practice, there would naturally be withdrawals as individuals move jobs. We feel the assumption used is reasonable to simplify the modelling without affecting the outcomes materially.
- No tax-free cash is taken at retirement
  - In practice, we would expect the majority of people to exchange at least some pension for cash at retirement. In terms of comparing CDC to IDC, taking tax-free cash would simply dampen the effect of any difference and so we believe it is proportionate to assume no cash is taken in order to simplify the modelling.

Appendix 1: CDC model approach

Projecting cashflows
We have used our in-house pension scheme valuation software to produce expected future cashflows for the relevant population assuming that pensions are fixed at the start date, 30 June 2023. This gives us a set of undiscounted, uninflated cashflows to feed into our further modelling. This involves making a number of assumptions and we comment further on these below.

We then use a separate model to estimate the cashflows that would be used for each future annual valuation of the CDC arrangement, where:

- Cashflows are increased to allow for accrual between the start date and the valuation date (including for new members)
- Cashflows are inflated to allow for previously calculated increases

Projecting asset values
The starting asset value has been set equal to the liability value at 30 June 2023 – i.e. we have assumed that the most recent increase is paid in line with inflation and that the funding position at this point is 100%.

Asset values are then projected forward each year by:

- Allowing for contributions in respect of the active population
- Allowing for benefits paid out in line with the most recent year of projected cashflows
- Allowing for investment returns and deduction of management expenses (which are covered in more detail below)

Future valuations
Each year the asset value is compared to the liability value in order to calculate the increase that can be payable. For this purpose the projected cashflows are discounted and future increases are allowed for in line with the methodology set out above. The increase due is calculated such that the asset value equals the liability value.

This increase (or reduction) is then taken into account when projecting the cashflows for the following year.

This gives a schedule of expected future CDC pension increases for the given population and a given investment scenario.

Valuation assumptions
In carrying out the annual assessment of funding we have aimed to use assumptions that would be considered best estimate at the time of that valuation as follows:

Assumption	Derivation
Inflation	25-year inflation spot rate at the time of the valuation (produced as part of the economic scenario)
Discount rate	Inflation plus 2.5% pa
Benefit increases	As set out in comments on scheme design above
Mortality	In line with mortality assumptions used to produce the cashflows

Appendix 2: CDC model – decumulation only

Our CDC decumulation model is built on the whole-life model with the following modifications.

Population
The population is based on the pensioner population from our whole-life model, i.e. it comprises 3,450 pensioners between the ages of 67 and 89, with 150 individuals in each age cohort.

Each age cohort is split 50% male and 50% female and further into 3 bands based on assumed prior earnings. The pensions in payment for these members remain as per the whole-life scenario, i.e. they broadly reflect the pension that would have been accrued in the whole-life model with target increases applied. We believe this is an appropriate starting point.

As for the whole-life case, this sample population is designed to reflect the membership of a typical, mature CDC arrangement. In decumulation-only arrangements we may see a higher weighting towards larger pensions, though this will depend to some extent on how this is ultimately taken forward.

In our build-up scenario, there is no starting population and it is assumed that members will join over time in line with the assumption for new entrants.

New entrants
Each year it is assumed that a cohort of 150 67 year olds join the scheme. Similarly to the whole-life case, we have allowed for different levels of earnings by assuming that 20% of these individuals transfer pots of £75,000 each, 60% of them transfer pots of £150,000 each and 20% of them transfer pots of £300,000 each. The size of the pots being transferred each year increases in line with inflation, i.e. the pot size remains the same in real terms over time.

New entrants are assumed to occur on each valuation date, and so are included in the valuation in that year and are eligible for benefit increases during that year.

Pricing
Pots are converted to pension using the valuation assumptions that apply at that time. Under the design this means that this takes future projected increases into account – i.e. if the last increase was inflation plus 2%, then this level of increase is effectively targeting going forwards and this is the increase on which the pot is converted.

The valuation assumptions are the same as for the whole-life case, except that the discount rate is lower at gilts plus 2% pa to reflect the lower risk investment strategy, which we discuss further below.

Appendix 3: IDC model design

Product design
The IDC scheme we have modelled is based on the following:

- Total contributions are paid on an identical basis to that modelled under CDC, to ensure consistency of comparison.
- In accumulation, contributions are invested in a fund in line with IDC asset allocations and charges.
- At retirement (at a consistent age of 67), our base model assumes that accumulated funds are invested in an income drawdown fund to begin in line with IDC asset allocations and charges, and then 100% of funds are used to purchase an annuity at a later age in retirement. Our base assumption is that annuitisation occurs at age 80.
- There are a number of models for combining the two main current decumulation products of income drawdown and annuity. However, we see this approach, as consistent with the "Flex First, Fix Later" model, being one of the models most commonly referred to. This is consistent with the approach of enabling flexibility and access to investment growth in early retirement, while taking away the risk of outliving your assets in later retirement, as retirees become more risk adverse. We also explore an alternative model of combined annuity and income drawdown at outset, as an additional sensitivity.
- As the CDC scheme modelled does not consider a spouse benefit, for consistency we assume a single life annuity. However, the ability to provide for a legacy benefit in income drawdown is a key difference to distinguish between CDC and IDC, and so this is modelled and accounted for in some results metrics.

Income Level
A key assumption for modelling income drawdown is the level of income that is taken each year.

The broad over-arching approach is to assume that the income is set at a level that is considered "sustainable for life" – i.e., that in maintaining that rate of income throughout retirement, there is only a small probability of outliving your assets (and income). The traditional approach is to assume that once an initial income is set, it is not subsequently reviewed during retirement, and is only increased/decreased each year by annual inflation.

There are a number of ways, assumptions and methodologies that could be used to calculate a sustainable withdrawal rate ("SWR"). It is important to note that there is no industry consensus on the best choice, and many approaches could be taken. A common industry reference is the "4% rule" from the research paper by William Bengen. A number of studies have shown that given recent UK economic conditions (prior to 2022), an SWR less than 4% would be appropriate (e.g. see LCP paper, link). Repeats of similar analysis allowing for the impact of the rise in interest rates in 2022 can show an SWR in excess of 4% to be appropriate. See for example article: Link (Milliman analysis). We have therefore chosen to model something consistent with this view.

SWR income levels and annuity rates are both correlated to interest rate levels, and where income is inflation-linked to inflation levels too. We have therefore set the SWR income level as a function of the annuity rate from our annuity model. A linear model has been calibrated to SWR levels of 3.3% in early 2022 and 4.8% in early 2023 (taken from Milliman analysis referenced above), and inflation-linked annuity rates taken during those periods. These correspond to general expectations around the "4% rule", under interest rate levels on each respective date.

Appendix 3: IDC model approach

Income Model (continued)

SWR income (age 67) = **0.65%** p.a. + **1.0** * immediate-linked annuity rate (age 67)

The positive uplift to the annuity rate reflects the expectation that higher income can be delivered through drawdown, given the ability to partially invest in growth assets that have a higher expected return relative to a fixed/linked portfolio of assets backing an annuity.

The SWR income level is set the same for both lifetime drawdown and drawdown + annuity models, assuming that the retiree would like to have the flexibility to be able to switch between the two approaches, depending on how circumstances unfold.

Once an SWR income level is set at retirement age 67, thereafter income is assumed to increase in line with inflation, without any further review. This is a simple approach which does expose a retiree to the risk that realised investment performance falls below that expected in setting the SWR and therefore the risk that the retirement fund is exhausted in later retirement and income from it ceases – such cases can be seen in the results where we consider metrics at different ages.

More sophisticated drawdown offerings may embed periodic income reviews to track whether income continues to remain sustainable (or if more income can be granted) in line with experienced investment performance. We note these types of offerings are still emerging in the market and are outside the scope of arrangements modelled for this paper.

Deterministic model

Consistent with CDC a deterministic cashflow projection has been used, with a consistent set of scenario sensitivities explored.

Projecting asset values and cashflows

We have used our in-house IDC retirement projection model, assuming a consistent start date of 30 June 2023. This models investment fund, contributions, expenses, drawdown income, annuity prices (between ages 67 and 80) and resulting annuity income. This can also apply discounting and survivorship to calculate the various required results metrics. The model is on an annual frequency.

Appendix 4: Assumptions (general)

Investment strategy

In our modelling, asset allocations are determined according to a balance between Growth, Income and/or Defensive portfolios. We believe there are some valid reasons for differences between CDC and IDC, both in the split between Growth, Income and Defensive and also in the make-up of constituent asset classes in these portfolios.

IDC portfolios & asset allocations

- A "Growth" portfolio, which is comprised as:
  - **70%** global equities
  - **15%** diversified growth / multi-asset credit
  - **5%** investment grade credit
  - **5%** index-linked gilts
  - **5%** private markets
- A "Defensive" portfolio, which is comprised as:
  - **20%** diversified growth / multi-asset credit
  - **35%** investment grade credit
  - **35%** index-linked gilts
  - **10%** cash
- Asset allocation by age:
  - **100%** growth in accumulation
  - **50%** growth / **50%** defensive in decumulation
  - **15**-year linear glidepath leading up to retirement
  - **5**-year linear glidepath into 100% defensive leading up to planned annuitisation

In setting representative IDC asset allocations, we have surveyed a number of sources of industry data, including data from Corporate Adviser website (link), the DC Investment Forum (Growing Pains Final Web) (link) and a recent paper by Lane Clark & Peacock (Master Trusts Unpacked: Default Investment Strategies) (link). We have also taken into consideration assumptions we have seen used by some pension or product providers in the market.

For accumulation, there is a wide range of asset allocations between providers, and allocations also vary over time – 2023 data shows higher allocations to risky assets than 2020 data for some schemes. At one end, a number of providers do not have any allocation towards fixed income. However, there are 2 notable large providers in the market that have a 20%-25% allocation to fixed income. We have therefore included a small extent of fixed income in our IDC growth portfolio..

For private markets, although historically IDC pensions have found it challenging to accommodate this asset class. The introduction of the LTAF vehicle has addressed some of those challenges, and we do see some providers already starting to take advantage of this. There has also been a push from the government, as per the recent Mansion House speech (link), and so we expect the industry to respond accordingly in future. Nonetheless, for individualised pensions there are greater liquidity needs during accumulation than you may expect for CDC. Also, the IDC market is highly competitive and so the comparative high cost of accessing private markets may still be a limiting factor. For setting expectation on how much the IDC industry will move towards allocating to private markets, it seemed sensible to reference the 5% allocation quoted in the likely influential Mansion House speech.

For decumulation, there is a broader range of at-retirement asset allocations between providers, which will crucially be influenced by the different at-retirement income paths that they offer. Given this, a 50/50 split seemed like a reasonable compromise. It acknowledges that one of the main reasons for the popularity of income drawdown, is the ability to participate in growth assets, but with some balance given the sequencing risk from income, and shorter time horizons.

Appendix 4: Assumptions (general)

IDC portfolios & asset allocations (continued)

Where there is data available on DGF, we do see several funds allocate towards this asset class, and we see no strong reason to differentiate between IDC and CDC. For fixed income, again there are differing approaches taken by providers, and so we have taken a neutral view between IG credit/gilts. We have also included a cash allocation in decumulation to acknowledge the higher cashflow liquidity needs.

Where data on glidepaths is available there were a wide range of periods used (from 10 to 35 years). But 15 years is one of the most common pre-retirement. For leading into planned annuitisation, a de-risking into bonds still seems sensible to help mitigate pricing risk, but that a short period is likely desired to maintain the benefit of growth assets, hence a choice of 5 years.

Appendix 4: Assumptions (general)

CDC portfolios & asset allocations

For the CDC scheme we have defined a Growth and Income portfolio as follows:

- Growth portfolio:
  - **65%** global equities
  - **15%** diversified growth / multi-asset credit
  - **20%** private markets
- Income portfolio:
  - **10%** diversified growth / multi-asset credit
  - **20%** private markets
  - **20%** investment grade credit
  - **40%** index-linked gilts
  - **10%** cash

For the base whole-life scenario we have assumed that the CDC arrangement will invest 50% in the Growth portfolio and 50% in the Income portfolio over the long term (and effectively assume that this is rebalanced each year). Based on the return assumptions adopted we estimate an expected return on this strategy in line with inflation plus 2.5% pa.

There are a significant number of ways that a mature, stable CDC arrangement could invest. We believe the strategy above balances what might be optimal for an arrangement with a target benefit increase in line with inflation with simplicity for modelling purposes.

There are allocations to diversified growth / multi-asset credit and private markets in both the Growth and Income portfolios. Both of these asset classes cover a very wide range of potential investments and whilst it is likely that the actual investments within these classes would be slightly different in each portfolio, for our modelling purposes we have assumed the return profile would be the same.

This means that the overall allocation to private markets in the base scenario is 20% of assets. Typically these would be more illiquid than other investments, though we believe this is acceptable in this situation as a stable CDC arrangement would be expected to be broadly cashflow neutral.

In the build-up case the scheme is likely to be able to justify a higher Growth allocation initially as it will not need to start paying significant levels of benefits for some time. We therefore allow for the investment strategy to change compared to the base case as follows:

- 100% in the Growth portfolio for the first 5 years
- Tapering linearly down to 50% Growth and 50% Income over the next 10 years.

Decumulation only

We don't believe that a CDC decumulation-only arrangement would be able to invest in the same way as a whole-life arrangement over the long term because of the more mature population it would have.

We have therefore assumed the decumulation-only arrangement will invest 25% in the Growth portfolio and 75% in the Income portfolio over the long term, which we estimate will provide an expected return in line with inflation plus 2.0% pa.

As per the whole-life case, in the build-up scenario there will be scope to increase the allocation to the Growth portfolio in early years, but again not to the same extent. We therefore allow for the investment strategy to change compared to the base case as follows:

- 50% in Growth and 50% in Income for the first year
- Tapering linearly down to 25% Growth and 75% Income over the next 10 years.

Appendix 4: Assumptions (general)

Investment returns

In order to capture the way that different arrangements deal with varying investment returns, it is important to consider investment scenarios that reflect volatility. Investment returns have been generated using Barnett Waddingham's asset risk modelling tool based on conditions at 30 June 2023.

The assumptions are based on a combination of historical analysis, econometric estimation, macro-economic model simulation and judgement both by Barnett Waddingham and external sources. The assumptions are intended to represent "best estimates" and are based on passive implementation with no allowance for potential additional risk or return as a result of active management (except for the fund of hedge funds, absolute return bonds and target return asset classes which are inherently actively managed). A range of assumptions could be justified and the output from the model is sensitive to the choice of assumptions; therefore the output should always be considered in the context of the assumptions that have been adopted. The model has been used to generate 10,000 scenarios showing returns over a future 75-year period.

We have selected the base economic scenario according to the following criteria:

- Minimum deviance from median returns on the CDC Growth and Income portfolios over 10, 30 and 60 year periods from outset.
- Average projected government bond spot rates used for annuity purposes within reasonable bounds.

The results are very sensitive to the scenario adopted and the timing of returns is important. There are other scenarios that could be considered as reflecting a broadly median scenario and the sensitivity of the results to different scenarios is set out in the results.

Deterministic model

In the time available, i.e. in order to produce the results before the DWP's consultation closes on 5 September 2023, it is not possible to build a full stochastic model of potential CDC outcomes taking into account variability of investment returns, economic conditions and mortality.

Instead we have built a model that will produce expected future increases for the CDC arrangement set out above for a given economic scenario, and will then produce results on a number of difference scenarios to show the sensitivity of the results.

Appendix 4: Assumptions (general)

Limitations of investment return modelling

The investment return model is not intended to be predictive of the future. Unexpected events can and do happen in global markets and such uncertainty is impossible to accurately model. The aim of the model is to help compare relative risk levels between different strategies and to provide an illustration as to the likely magnitude of fluctuations during normal market conditions.

The output of any model is only as good as the assumptions that the model uses. The assumptions we have used are based on a combination of history, current market conditions, forward-looking analysis and judgement. Such assumptions clearly incorporate a significant degree of subjective judgement.

The future is, of course, unknown, and if the world economy turns out to be different from that implied by the assumptions then the level of returns could turn out to be higher or lower than predicted by the model.

It is important to bear in mind that a model which overestimates the level of risk can cause as many problems as one which underestimates risk as it can lead to missed opportunities and an overly cautious stance. In selecting assumptions, therefore, the emphasis is on illustrating the potential downside, without a focus on avoiding underestimation of risk swamping all other considerations.

By taking guidance from the past along with a pragmatic, reasoned view of possible future market movements, asset-liability models can provide helpful information to assist in considering the implications of investment strategies. Models cannot provide the single "best" or "right" answer, and cannot predict the future.

Gilt rates

Projection gilt rates are used within the model to determine an appropriate annuity rate at projected ages when annuities are purchased. For simplicity, this is based off modelling a single representative 10-year gilt rate.

Given the scope of this work is limited to modelling a small set of projected investment scenarios, there is a limit to what can be achieved through ranking of scenarios for multiple stochastic variables. For a thorough assessment of multiple variables, a full stochastic model would be required.

The primary focus of scenario choice has been to explore how differences in long-term investment returns (and timing of investment returns) can impact on the differential between CDC and IDC. Income delivered via IDC through an annuity is also variable according to volatility in potential annuity rates given timing of movements in gilt rates and spreads (amongst other factors).

For determining annuity rates, we have therefore taken the approach of taking the average gilt-rate from projection start to age of annuitisation. This ensures that gilt rates are representative of the particular economic scenario, but at the same time removes the impact of stochastic variability from selecting a gilt rate in a single year. This helps avoid introducing noise into results that could lead to a distortion in comparative headline results. A similar approach is taken with inflation as well.

Appendix 4: Assumptions (general)

Inflation
Future inflation projections used in the model are provided by BW's asset risk modelling tool. This is based on Retail Prices Index (RPI) inflation.

In practice we expect the majority of CDC schemes to target increases based on Consumer Prices Index (CPI) inflation, and it is expected that the calculation of RPI will change in 2030 to be in line with the calculation of CPIH (which, broadly, is the CPI but with housing costs included).

Whilst we do not expect there to be a significant difference between CPIH (and, thus, RPI) and CPI in the long term, there are expected differences between RPI and CPI over the period to 2030, e.g. because of the different method of calculation. In order to simplify the modelling we have not made any explicit allowance for these differences in our results, and simply quote results relative to inflation.

Mortality – base table
We believe that the SAPS tables published by the Actuarial Profession's Continuous Mortality Investigation (CMI) are the appropriate starting point when considering which mortality tables to use for the hypothetical population of a CDC scheme. We have therefore used the S3PA tables, which are the most recent available and reflect data for all pensioners. These tables are adjusted by salary to reflect the expectation that higher earners will have higher life expectancies as follows:

Income band	Adjustment
Low	110%
Middle	100% (no adjustment)
High	90%

Mortality – future improvements
Again, we believe that using the most up-to-date information published by the CMI is the appropriate starting point here. The CMI produce a model for future mortality improvements which is updated on an annual basis, the latest version being the CMI_2022 model which was published in June 2023.

The model allows users to change a number of parameters. We have used the core version of the model with the following parameters, which we believe to lead to a best estimate of future mortality improvements:

- Long-term rate of improvement of 1.25% - this sets the rate which the model converges to over time
- Initial addition to improvements of 0% - this could allow for a short-term improvement to reflect differences between improvements observed in DB pension scheme members and those observed in the general population. We think it is reasonable to assume that members of CDC and IDC schemes will not generally see this effect so have not allowed for any addition.
- Smoothing parameter of 7.0 – this allows the user to place more or less weight on more recent data and we have used the standard core parameter

The model also includes separate parameters allowing users to place different weight on data from 2020, 2021 and 2022. In these years mortality data was significantly influenced by the Covid-19 pandemic, and it remains uncertain what impact this will have on short- to medium-term life expectancy. The core version of the model uses 2020 and 2021 weight parameters of 0% and a 2022 weight parameter of 25% and we believe this is reasonable to use.

Appendix 4: Assumptions (general)

Expenses

Under IDC, there are a range of pricing structures in the market, with different balances between components of % of fund value and other charging bases, such as a per member fee. Data is also only publicly available for a limited number of providers. Where data is available (amongst the same sources used for setting asset allocation assumptions), and convertible into a pure % of fund value basis, we have seen a small number of providers around the 0.30%-0.35% range. Leaning on a conservative view towards setting a pricing assumption, we have selected 0.35% p.a. as a representative level. We do note that there are more competitive schemes in the market, and so appropriate scheme selection could help to improve the performance of IDC. However, it is likely more important to consider any relative structural differences between IDC and CDC.

As already noted, it is difficult to say at this stage what an appropriate level of expenses for a CDC scheme is. There is unlikely to be any significant difference in terms of investment management fees charged as both CDC and IDC will generally have the benefits of scale.

Any difference is therefore likely to come from differences in administration. For example, CDC arrangements would not be expected to need to keep track of individual pots for members, but do need to carry out annual valuations to calculate increases.

On balance we believe it is suitable for the purpose of this modelling to assume that expenses for a CDC arrangement will be the same as those for an IDC arrangement – i.e. 0.35% p.a. The exception to this is in the scenario where the CDC arrangement is being built-up from scratch, where we have assumed higher expenses initially to reflect fixed costs, e.g. in respect of the annual valuation.

We have estimated these based on the outcome of the base case modelling, and in the build-up case use expenses of 9% in year 1* which gradually reduce to 0.35% pa from year 15 onwards as the asset pool is built up. In the decumulation only model, the tapering period is 10 year, as the assets reach a reasonable scale over a shorter time period. This allows for administration costs and investment management charges.

Annuity Modelling

Under IDC, where an annuity is purchased, to ensure consistency with the CDC benefit design, we have assumed a single life, inflation-linked annuity, without any guarantee period.

Annuity prices have been modelled by use of an explicit annuity calculator based upon the following assumptions:

- **Gilt rates** → as noted previously, a long-term gilt rate is taken from the scenario. A 10-year gilt rate has been modelled, and a flat gilt curve is assumed.
- **Inflation rates** → as noted previously, a long-term inflation rate is taken from the scenario. A flat projected inflation curve is assumed.
- **Mortality** → the same mortality basis as the outer projection is used
- **Other Costs + Margins** → the gilt rate is adjusted by an additive margin (**-1.0%).** This captures the combined impact of cost of capital, expenses, profit margin and spreads earned over the gilt rate on underlying bonds. This has been set by sourcing actual market pricing (from comparison.moneyhelper.org.uk) and back solving for the margin, assuming market-implied gilt and inflation curves on the calculation date. This was done on a number of dates in 2023, where market conditions were relatively more stable, and so less likely to be distorted by pricing lags.

  We note that this parameter is not likely to be directly comparable to annuity pricing margins quoted in other research papers, due to the specific choice of annuity benefit and the particular structure of the annuity pricing model.

*While member-facing charges would be constant in the build-up case (the same as in the stable case), the actual expenses in the early years would be met from pooled assets in the fund, which high relative to the low initial assets.

Appendix 5: Basis for comparison

We have considered two key metrics in performing our comparison. These metrics are considered over three periods, assuming survival to age 75, age 80 and age 90.

Average replacement ratio
The replacement ratio compares income received to the salary immediately prior to retirement, i.e. the proportion of "final" salary that the individual then receives in the first year of retirement.

For arrangements offering a fixed, guaranteed pension this could be used without further thought, but income from CDC arrangements and income drawdown will be variable and it important that this trait is captured. We will therefore consider the average annual income received over the period to the relevant age.

As we are looking at average income, we also need to change the comparator from simply the salary before retirement. For example, assuming income continues to increase in nominal terms then the average replacement ratio would be expected to be higher at age 90 than at age 80. However, the key question is whether those increases have kept up with inflation, and so our comparator will be the average inflation-adjusted salary prior to retirement, calculated over the same period.

Internal rate of return
The internal rate of return considers the value of the contributions paid relative to the value of the benefits received and effectively shows the rate of return that the individual is receiving on the contributions paid.

Our calculation shows the discount rate required such that the present value of the contributions paid equals the present value of the benefits received over the relevant future period.

In the CDC arrangement, this only considers the pension income as our base scenario includes no spouse pension payable on death.

In the IDC case, this also includes the value of any leftover pot that is paid to the individual's dependants or estate. This therefore picks up one of the key differences between CDC and IDC

Other comments
There are a number of different metrics that could be used to compared CDC and IDC benefits in this context. In the absence of a full stochastic analysis we believe the metrics used are helpful to summarise the differences in individual outcomes.

Appendix 6: Investment scenarios

High / Low investment returns
As for the base case, the high and low investment return scenarios have been selected from the scenarios generated by the asset risk modelling tool.

To select the scenarios we have considered minimum deviance from 75th percentile returns for the high return scenario and 25th percentile returns for the low return scenario. Other criteria are unchanged from the base case.

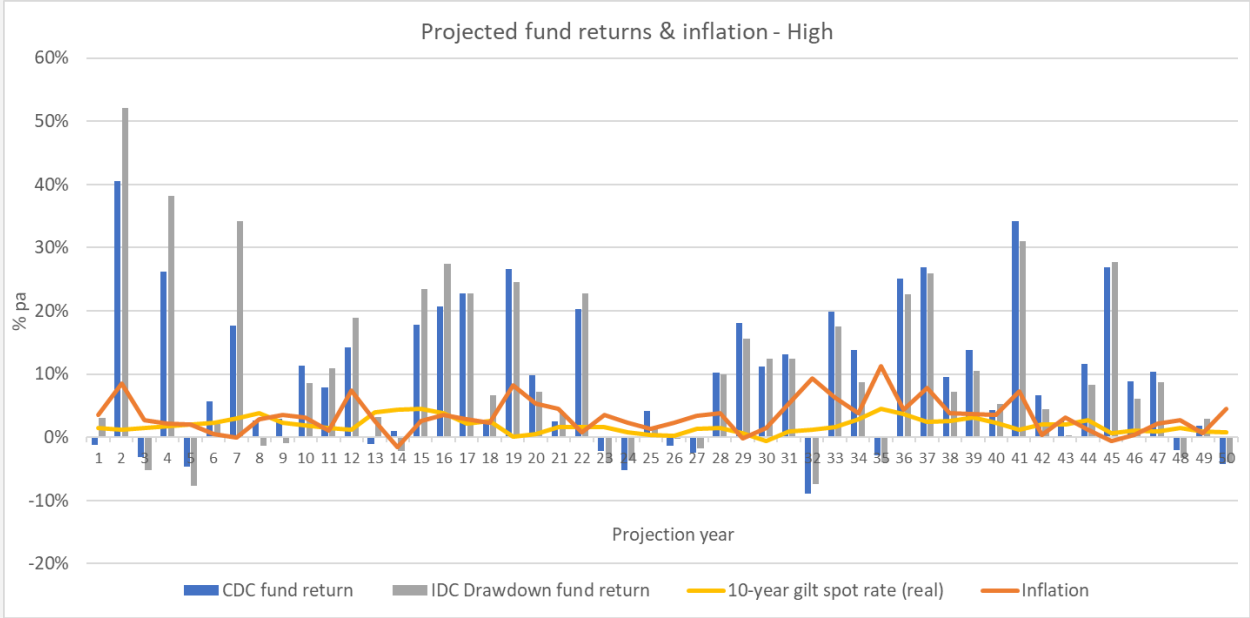
An illustration of the returns and financial statistics under this central scenario is shown in the charts to the right (for CDC this is the pooled fund return and for IDC this is the return assuming drawdown for life strategy for a member age 40 at outset).

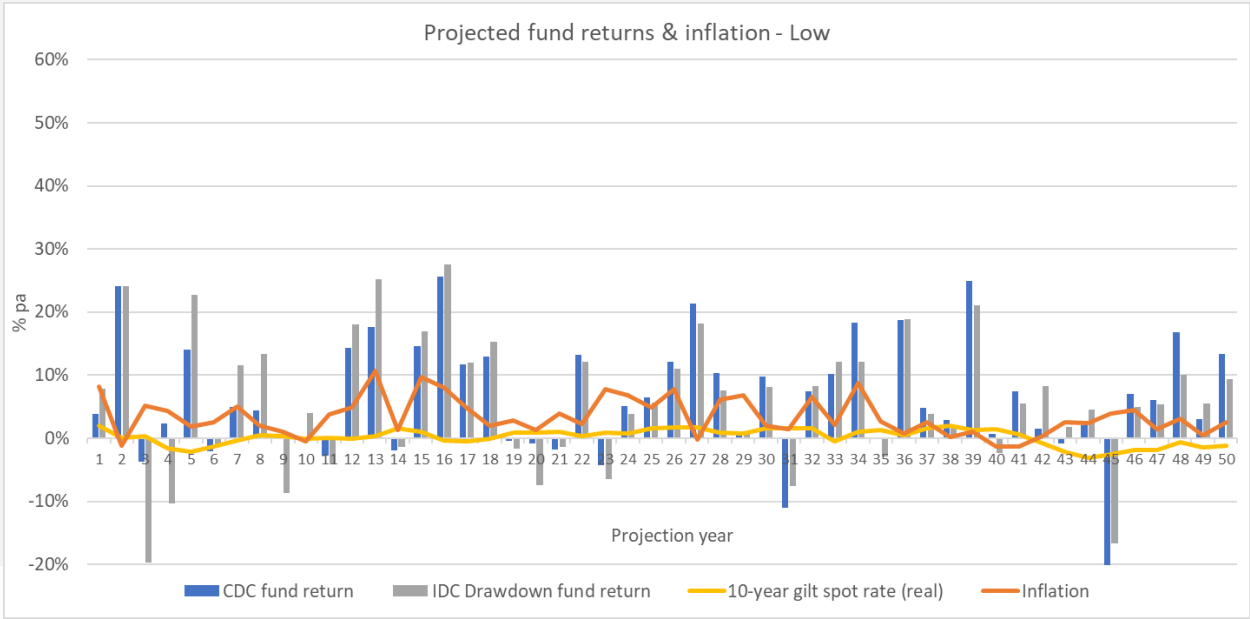
Timing of returns
Although overall returns are important, the sequencing of these returns is also important. For example, a run of poor returns at an inopportune time can have a more significant impact on outcomes than if these occurred at a different time.

For this purpose we have considered a separate investment scenario which targets:

- 10th percentile returns over the 10 years from outset
- Median returns between 10 years and 30 years from outset
- Median returns overall for the 60 years from outset

As above, other criteria are unchanged.





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We are also grateful for the input from our colleagues in the Netherlands in preparing the section of the report that describes the Dutch experience to date with CDC.

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