

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

September 2020



1. Introduction and summary

This note describes our analysis behind the main statistic included in our Guide to CDC, which can be downloaded from [here](#).

A key feature of CDC is that, for a given level of contributions, higher pension levels are expected than those from other types of pension scheme. This mainly arises from the level of asset returns expected to be achieved on the contributions, and that is what we analyse in this note. Any differences in operational expenses or pricing of demographics would be expected to have a much smaller effect.

In summary, based on the following analysis we have concluded that, for a given level of contributions, CDC pensions are expected to be on average:

- **around 70% higher than Individual DC (IDC) insured annuities, and**
- **around 40% higher than pensions provided in DB schemes.**

In other words, for a given amount of contributions, for each £10,000 payable from an insured annuity bought with a DC pot, or £12,000 payable from a DB scheme, the CDC scheme would pay out £17,000.

Of course, under the classic investment trade off, higher target returns brings higher risk. Over the short term CDC schemes pass limited risk onto member pensions due to the way experience is spread; over the long term pension levels are ultimately driven by investment performance. The levels of risk borne depend on each CDC scheme member's age – naturally, for a member with a very short remaining life expectancy, there is less remaining risk of variability in future pension increase levels. IDC annuity levels are uncertain before retirement, but guaranteed by the insurer once the annuity has been purchased; DB pension levels are guaranteed by the sponsoring employer (if they remain solvent). CDC pension levels are variable before and after retirement. There is therefore a wide range of potential comparative pensions either side of the 70% and 40% we have determined; in some possible scenarios CDC pensions would be more than 70% / 40% higher, in others less than 70% / 40% higher and in more extreme scenarios CDC pensions could ultimately be lower than under other arrangements. In this note we analyse the expected pension levels; we acknowledge that CDC pensions usually come with more variability than other kinds of arrangements.

Levels of pension purchased through an IDC annuity depend on DC investment strategy before retirement, and insured annuity purchase terms. We have assumed a relatively typical investment strategy and pricing as described further in Section 3 below.

For DB schemes, pension levels are fixed and contribution levels vary. However, the £ pa of pension expected to be met by each £ of contribution depends on expected asset returns which in turn depend on the scheme's investment strategy. Therefore CDC vs DB pension comparisons vary by DB scheme. The 40% above represents an average across DB schemes, with reference to asset strategy and discount rate data from the Pensions Regulator, as described further in Section 4 below.

2. The approach used for our analysis

We have used for our analysis the high-level design **published** by Royal Mail for their anticipated CDC scheme following our initial work with them up to 2018. For this analysis the pertinent feature of the design is the investment strategy, which drives the expected level of pension generated by the scheme. Under the design, allowing for the expected scale of the scheme and resulting extent of risk sharing between members, the investment strategy (for assets in excess of amounts needed for cash liquidity) is in summary:

- 100% in Return-Seeking Assets supporting pensions for members until the normal retirement age of 67,
- switching uniformly from this position over a 23 year time frame to
- 100% in Low-Risk Assets supporting pensions for members from age 90 onwards.

The design also features a flat contribution rate (15.2% of pay) and flat pension accumulation rate (1/80th of pay for each year of service) across all members and so, as for a DB scheme, the actuarial value of accumulations varies by member and over time. For the purpose of this analysis we have looked at the expected pension level for an average member, currently aged 45 years. Other CDC designs are possible where the actuarial value of accumulations (as a % of pay) is equal in each year for each member, and under these designs there would be less variability by age in the comparison with individual DC annuities.

Under the Royal Mail design, all variation in investment and demographic experience is catered for by varying the pension increase level. The aspired average pension increase level at the point of opening the CDC plan is Consumer Price Inflation (CPI) + 1% pa.

As part of our work for Royal Mail in 2018 we modelled future pension increase levels, based on median return expectations and variability levels from the Willis Towers Watson Investment Model. The Model had two calibrations: "lower for longer" (with a greater emphasis on market pricing) and "yield reversion" (with a greater emphasis on long-term history). For the Royal Mail modelling we used asset returns positioned broadly between the two calibrations, and used a 30-year period. Although for the purpose of this analysis we are looking at longer periods, the Investment Model is not typically used for periods of over 30 years, and for simplicity we have assumed longer term median returns at the 30-year level.

For ease of comparison with returns from other arrangements, we have described return assumptions in this note as return margins against gilts. (This is however not how CDC asset return expectations would usually be expressed, where CPI is typically a better benchmark.)

The resulting median returns over a 30 year period were as follows:

- For Return-Seeking assets we modelled a well-diversified portfolio summarised as: Global equity 30%, private markets 18%, diversified growth assets 36% (ie alternative assets such as hedge funds and reinsurance), and credit 16%. On our Model, the median return on that portfolio is 0.25% pa less than on a global equity portfolio, resulting in a median return of gilts + 3.85% pa. This assumption is central to the analysis, and we believe it would fall within the reasonable range of most actuarial firms and economists.
- For Low-Risk assets we modelled UK gilt holdings, with no allowance for potential higher returns on longer-term investments such as infrastructure.

In practice the portfolios are likely to feature more varied asset holdings, in order to seek greater efficiency (ie greater expected return compared to the level of investment risk), however for the purpose of this analysis we have used the simple portfolios from the 2018 modelling.

The results of the comparison simply reflect the different asset returns expected under the arrangements. In order to determine these in a way which compares 'like with like' as much as possible we have:

- assumed joint contribution rates of 15.2% of pensionable pay for each arrangement
- assumed each arrangement is newly opened
- assumed a common retirement age of 67 (each with no '5 year guarantee' lump sum on death before 72)

- assumed 50% contingent spouse's pensions are payable under each arrangement
- assumed the arrangements provide pensions with comparable price inflation linkage (expected price inflation linkage in the case of the CDC scheme)
- used common growth asset and low-risk return assumptions, price inflation and demographic assumptions, and assumed no cash commutation - we have shown the effect of this as a sensitivity

We have made the comparison by calculating deferred annuity factors to calculate the value of the pension benefits accumulated over that year based on the expected asset returns under each arrangement, and calculating the ratio of the factors.

We have made no allowance for the different operational expenses that could arise between the arrangements. The Royal Mail CDC scheme would be the first of its kind in the UK, and therefore would have the expenses of trading new ground and of high-quality governance, however it would enjoy economies of scale which are expected to make it cost effective. Any differences in expense levels compared to IDC or DB expenses would be expected to have a much smaller effect in the difference in expected investment returns that we have analysed.

The results of the analysis depend on the assumptions made, and other organisations are likely to determine different comparative pension levels. In this note we have sought to use assumptions which are in the middle of a justifiable range.

3. CDC pension vs Individual DC (IDC) annuity levels

Central analysis

As summarised in section 1, we have calculated that CDC pension levels are expected to be on average 70% higher than an IDC insured annuity due to differences in asset holdings.



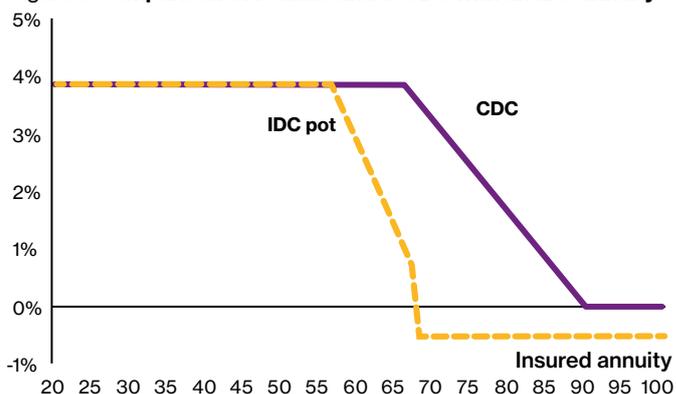
We have aimed to make this a 'like with like' comparison as much as possible, however we do not make allowance for the fundamental difference in the nature of the pensions provided by the two vehicles. In particular, in payment, the CDC plan's increases are variable, whereas from the point of purchase the insured annuity increases are guaranteed by the insurer. The resulting 70% difference can be considered to be the combination of the premium paid for the insurer's in-payment guarantee and the more conservative investment approach taken for IDC members approaching retirement age in order to reduce their exposure to market volatility in the lead up to the annuity transaction.

For the IDC insured annuity, we have assumed that:

- The IDC member invests in a typical default investment strategy, holding 100% growth assets up to age 57 and then uniformly de-risking to bonds (50% gilts / 50% credit) at retirement at age 67 – for which we have assumed median 30-year returns are gilts+0.6% pa.
- We have based the analysis on insured inflation-linked annuity prices based on Statutory Money Purchase Illustration (SMPI) assumptions that have been in place from 2017/18 to 2020/21 (to the date of this publication) of 0.5% pa below gilt yields. From the data available, this is broadly reflective of the best IDC price that can be achieved in the market.

The resulting differences in expected investment returns are illustrated in Figure 1 below.

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



The 70% difference in pension levels we have determined represents the combination of the differences between the purple and dashed yellow lines, weighted to allow for joint-life survival rates at in-retirement ages. The pre-retirement period would be expected to improve CDC pension levels by around 15% (which roughly equates to an average of 1.5% pa over 10 years where the returns differ between ages 57 and 67) and higher in-payment returns would be expected at around 50% (which roughly equates to a difference of 3.1% pa over an average term from 67 to the pension payments of 13 years). (These compound to 70%, ie $1.15 \times 1.5 \approx 1.7$)

To provide a simple illustration of the resulting difference in £ pa pension amounts: if a member joins the CDC plan age 27 on pensionable pay of £25,000 pa, and receives pay increases and CDC plan increases in accordance with CPI +1% pa, this equates to an anticipated CDC pension from 67 in today's money (using CPI +1% pa) of £12,500 pa, ie 50% of the final year's pensionable pay, compared with an IDC annuity of c£7,300 pa, 29% of pay.

Sensitivities

As sensitivities to this 70% difference:

- To give an idea of model risk, if growth return assumptions were 0.5% pa lower (higher) than gilts +3.85% pa, this comparative difference would be c 10% lower (higher).
- If we were to allow for commutation of 25% of the value of a CDC pension (for a CDC scheme design in which, unlike the RMG design, there is a commutation option), this comparative difference would be c 15% lower because the post-retirement differences in asset returns would not feature for that portion of the assets.
- If for the IDC member we were to allow for a de-risking period (ie the transition from growth assets to bonds) that was 5 years shorter (longer) then the difference would be c 8% lower (higher).
- We have used standard SMPI annuity terms. Members who qualify for an impaired annuity such as smokers or those in ill health, and/or who do not have a spouse, would receive a better price for their IDC annuity than illustrated, and so the difference would typically be around 15% to 30% lower.
- For simplicity, we have not reduced the IDC annuity level to allow for any prudence in the insurers' mortality assumptions vs those assumed expected for CDC plan members. The CDC assumption is based on recent mortality experience of ex-Royal Mail employees and a widely used allowance for future improvements in life expectancy. If we were to allow for this, the estimated relative CDC pension level would be c 5% higher.
- If we were to look at a member who was five years' older (younger), there would be very little difference in the comparison if the CDC scheme is designed to have variable accumulation rates so that the value of accumulation is equal to the contributions paid in respect of that member. Under a design with flat accumulation rates, there would be a difference in the actuarial value of the CDC benefit by an individual member's age to the extent that expected pre-retirement IDC asset returns are different to expected CDC pension increases.
- As described above, our analysis has been based on asset return assumptions from our 2018 modelling. Since then gilt yields have materially fallen, and expected asset returns (above gilts) for return-seeking assets on the Willis Towers Watson Model have generally increased. This means that, if we were to update our analysis based on a current model, we expect the difference would be higher. However, market conditions in 2020 have been affected by the Coronavirus pandemic, and it remains to be seen how asset return expectations might settle in time.



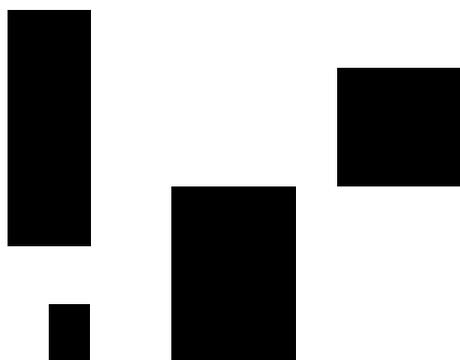
Comparison with Individual DC drawdown

A different kind of comparison can be made between CDC and Individual DC drawdown. Drawdown pots could be invested in accordance with a CDC scheme, to aim to achieve the same returns (although this is likely to be more expensive operationally as the investment expenses would be borne solely by the individual member). The difference then relates to the risk the individual is taking on in two main respects:

- The drawdown member would bear all the investment risks themselves, whereas under the CDC design, investment risks are spread over time and shared with other members, resulting in smoothing of pension levels.
- For the drawdown member, if any money is left over when they die, it could be left to their dependants. However because the drawdown member doesn't know their lifespan they run the risk of drawing down too slowly or running out of money. Under the CDC design, pensions are paid to each member for their retired life – the variation in cost to the scheme largely evens out across members with shorter lives and those with longer lives.

These risks to the drawdown member could lead them to be cautious in choosing investment strategy and drawdown rates, which would both be expected to lead to lower levels of annual retirement income.

Another difference is in the governance arrangements. A CDC scheme is run by trustees, and the member does not need to make investment or drawdown decisions. Under DC drawdown, the member can either make their own decisions, or follow a 'default' strategy if offered by the DC scheme. Employees might have a preference for one or the other of these approaches.



4. CDC vs DB pension levels

DB schemes are collectives (as for CDC); however their investment strategy is usually constrained by having to protect from the risk of a sponsoring employer being unable to make good any deficit. As a result, most DB schemes hold lower proportions of return-seeking assets than under Royal Mail's CDC design. Because of this, based on the following analysis, we have concluded that for a given level of contributions, CDC pension levels would be expected to be on average around 40% higher than DB pensions.

This comparison will vary materially between DB schemes depending on their investment strategies. For those DB schemes which are able to take relatively high levels of investment risk, the difference would be less. For those particularly low risk DB schemes, relative CDC pensions could be twice the size or even more for a given contribution rate.

Central analysis

We have sought to make a comparison based only on the different returns expected from the different investment strategies of the CDC and DB schemes.

In our analysis we have ignored the pace of scheme funding, focussing solely on the difference in the ultimate benefits arising from a CDC and DB pension arrangement for a given cost.

DB scheme funding targets must be prudent, and therefore future service contribution rates typically include a margin for prudence above the expected cost of funding the benefits. If those expectations are borne out over time, the DB scheme would develop a surplus which could be used to subsidise contribution rates for further service. Therefore in that sense the prudence margin does not represent an additional cost of DB pensions, and we have sought to exclude the effects of prudence margins from our analysis.

Likewise, DB schemes often require contributions, in addition to those in respect of future benefit accrual, to make good past service funding deficits, which may be as a result of investment market volatility. This cost volatility can be difficult for sponsoring employers to manage, however we have not 'penalised' DB schemes for this in our analysis.

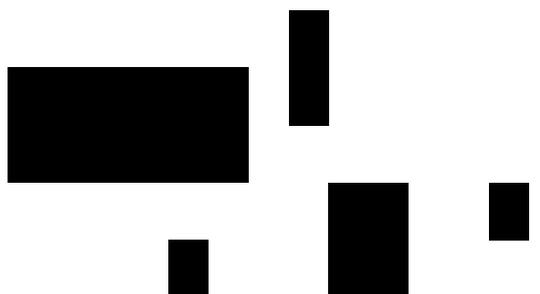
For our analysis we have sought to determine average asset return expectations on DB scheme asset portfolios. We have done this in two ways, by seeking to remove the prudence from the discount rates, and also by looking at expected returns on the asset holdings themselves.

It is rare for new DB schemes to be set up in recent years, and so data is very sparse on the investment strategies for new DB schemes. For our analysis we have therefore considered the following data relating to existing DB schemes:

A. The Pension Regulator’s **scheme funding analysis 2020** which covered valuations in tranche 13 (effective dates in the year to 21 September 2018, which tallies with the timing of our modelling of the Royal Mail scheme). This showed:

- i. Average DB scheme past service (“Technical Provisions”) discount rates of 0.8% pa above 20-year gilt yields. This statistic has gradually reduced in recent years, we expect partly due to the maturing of DB schemes.
- ii. For those schemes adopting a dual discount rate methodology, the implied average discount rates were gilts +1.70% pa pre-retirement and gilts +0.35% pa post-retirement. The single equivalent discount rate is similar for the dual discount rate methodology valuations and all valuations in the tranche.
- iii. Existing less mature schemes on average hold around 50% of assets in return seeking and mature schemes around 35%.

B. We are not aware of publicly-available data showing the prudence margin adopted within funding targets. However, the Willis Towers Watson database of valuation assumptions shows that for c200 clients where this data is available (combined assets >£300bn), the most recent Technical Provisions included an average total prudence margin of around 15%. Average prudence margins are higher for less mature schemes, at 20% for schemes made up mostly of non-pensioner members. Prudence margins typically feature partly in mortality and other demographic assumptions but mainly in discount rates. Allowing for all of this, the discount rate prudence margin could be considered to be on average around a 0.5% pa deduction from best estimate returns in the post-retirement period, and 1.0% pa in the pre-retirement period.



We have then determined the average 40% difference between CDC and DB benefit levels as follows:

- We have calculated deferred annuity factors for an average 45 year-old employee on both the CDC and DB investment strategies. We have used common demographic assumptions for each, based on the latest available mortality and future improvement tables (SAPS3 base tables, and CMI 2019 future improvements with a 1.5% pa long-term rate).
- For the CDC investment strategy, we have used the assumed rates of return from the Willis Towers Watson Investment Model as set out in section 2 above.
- For the DB investment strategy, we have used assumed best estimate asset returns of:

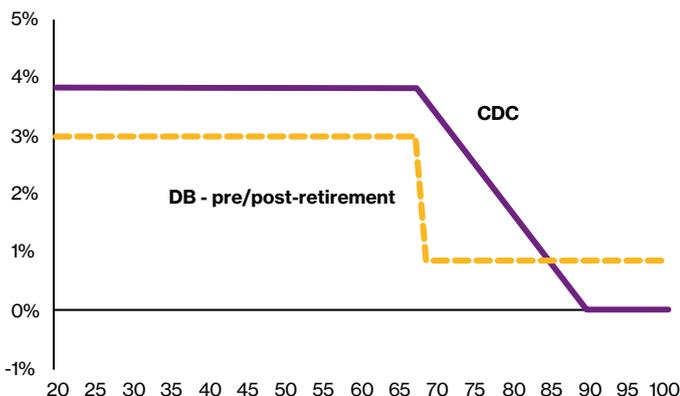
- Gilts +3.0% pa pre-retirement, and
- Gilts +0.85% pa post-retirement

For the pre-retirement rate we have taken the prudent gilts +1.70% pa average discount rate (data item A above) with an addition of 1.0% pa to remove the prudence margin (from B above), which would give gilts +2.70% pa. We have then used a higher figure, of gilts +3.0% pa, to make approximate allowance for the likelihood that an average new DB scheme would have a lower non-pensioner average age than an existing open DB scheme and would be likely to take more risk.

For the post-retirement rate we have taken the prudent gilts +0.35% pa average discount rate (data item A above) with an addition of 0.5% pa to remove the prudence margin (from B above). We consider that an average new DB scheme’s post-retirement strategy is likely to be similar to that for average existing DB schemes.

- We note that the above is not a perfect ‘like for like’ comparison, since UK DB schemes’ discount rates, before allowing for prudence, will be based on views of trustees, sponsors and different advisers. In addition, it is based on limited data. However as a sense check we note that on the Willis Towers Watson Investment Model return assumptions, the DB best estimate returns this would be consistent with assuming pre-retirement holdings of c75% return-seeking assets and post-retirement holdings of c25% return-seeking asset holdings (often partly through use of corporate bonds), which seem reasonable relative to data item A(iii) above.

Figure 2: **Comparison of returns under CDC with a typical DB scheme**



The resulting differences in expected investment returns are illustrated in Figure 2 above. For simplicity, we have shown the DB asset return expectations as being level in each of the pre- and post-retirement periods, although in practice asset holdings are likely to vary at different maturities within these periods.

The 40% difference in pension levels we have determined represents the combination of the differences between the purple and dashed yellow lines, weighted to allow for joint-life survival rates at in-retirement ages.

The pre-retirement period would be expected to improve CDC pension levels by around 20% (which roughly equates to an average of 0.85% pa over an average of 22 years from age 45 to age 67 and weighting for the timing of contribution receipts), and higher in-payment returns would be expected at around 20% (which roughly equates to an average difference of 1.45% pa over an average term of 13 years from 67 to the pension payments).

Sensitivities

As sensitivities to this 40% difference:

- To give an idea of model risk, if growth return assumptions were 0.5% pa lower (higher), this comparative difference would be c 5% lower (higher).
- If we were to assume that DB return-seeking asset holdings 10% higher (lower) before and after retirement, this would reduce (increase) the comparative difference by c 15%.
- If the average member was five years' older (younger), this would reduce (increase) the comparative difference for this average member by c5%.
- If we were to look at an individual member who was five years' older (younger), under CDC and DB designs with flat accumulation rates, there would be a difference in the

actuarial value of the CDC and DB benefits by age to the extent that the benefit increases differ over that period.

- If we were to allow for potential commutation of CDC pension (for a CDC scheme design in which, unlike the RMG design, there is a commutation option), this comparative difference would be c5% lower because the post-retirement differences in asset returns would not feature for that portion of the assets.
- As described above, our analysis has been based on asset return assumptions from our 2018 modelling. Since then gilt yields have materially fallen, and expected asset returns (above gilts) for return-seeking assets on the Willis Towers Watson Model have generally increased. This means that, if we were to update our analysis based on a current model, we expect the difference would be higher. However, market conditions in 2020 have been affected by the Coronavirus pandemic, and it remains to be seen how asset return expectations might settle in time.

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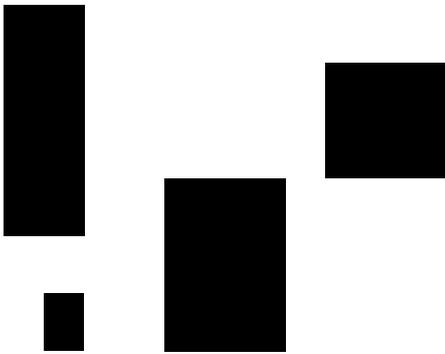
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