

Modelling Collective Defined Contribution Schemes

A summary of The Government Actuary's
Department modelling of collective
defined contribution schemes

Contents

1	Headline findings.....	3
2	Background and objectives	4
3	What is a collective defined contribution (CDC) scheme?	5
4	Description of modelling approach	6
5	Results	8
5.1	Level of returns for members under CDC schemes.....	8
5.2	Predictability of income in retirement in CDC schemes	9
5.2.1	Likelihood of cuts in projected pensions	9
5.2.2	Magnitude of increases and cuts to projected pensions over time	12
5.3	Intergenerational transfers in CDC schemes	15
5.4	Stability of CDC schemes	17
5.5	Reducing volatility in CDC schemes	18
6	Conclusions.....	20

1 Headline findings

Level of returns for members under collective defined contribution (CDC) schemes

- CDC schemes do appear to exhibit superior performance on average when compared to conventional DC schemes. In theory this improvement is in the order of 20 to 25 per cent, but in the simulation it is as high as 39 per cent for some members.
- Even when tough conditions are imposed on CDC, the median pension outcome from a CDC scheme is higher than the median outcome from a DC scheme.

Predictability of income in retirement in CDC schemes

- Relative to DC there is more predictability in an individual's starting pension; the standard deviation of pension outcomes across the scenarios modelled is lower in CDC schemes than in DC schemes.
- However there is still a large degree of variability in benefits, particularly for younger members where the volatility is greater.

Intergenerational transfers in CDC schemes

- There is significant doubt about the ability of the scheme to manage risk successfully in a way which is fair to different generations of scheme members.
- This is due to the existence of cross-subsidies which favour pensioner members over non-pensioner members and early cohorts of retirees to later ones. These features are inherent in the modelled CDC scheme design, although the use of additional prudence in the actuarial basis used to allocate target pensions would change the balance of these cross-subsidies.

Stability of CDC schemes

- It would be very difficult to contain risk levels for schemes that had very small numbers of new entrants. When there are few or no new members there is a higher probability of a scheme failing and leaving some members without any pension or facing significant cuts being made to younger members' pensions.

Reducing volatility in CDC schemes

- Although CDC already appears less volatile in comparison to traditional DC, volatility of CDC outcomes can be further reduced by: (i) shifting to a more conservative investment strategy¹ (although this comes at the expense of a lower pension); or (ii) initially targeting a fixed rate of pension increase rather than a floating increase linked to inflation and the level of available assets (although this might increase the risk of real terms cuts in pensions if the rate of inflation exceeds the targeted level).

¹ This is also an option in a standard DC arrangement.

2 Background and objectives

This paper sets out the main results of modelling carried out by the Government Actuary's Department (GAD). The objective of this analysis was to provide an insight into how Collective DC (CDC) schemes might perform in practice in a UK context. This covers an investigation of the following factors:

- A comparison of the pension outcomes from CDC and standard DC schemes;
- Predictability of retirement income from CDC in comparison to standard DC schemes;
- The nature of intergenerational transfers in CDC schemes;
- The conditions required for a CDC scheme to be sustainable; and
- Means of reducing volatility in CDC schemes.

The modelling focused on a particular proposed CDC scheme design and a particular actuarial basis for allocating members' target pensions, although a number of alternatives were also investigated. The actuarial basis is particularly important in determining the level of "fairness" between different generations – the more prudent the approach, the less well early generations of pensioners are likely to do relative to later generations. The scheme modelled aims to use a small degree of prudence in allocating target pensions, but as can be seen from the results in practice this turned out to be overgenerous to earlier cohorts of retirees.

3 What is a collective defined contribution (CDC) scheme?

The modelled CDC scheme is a form of DC arrangement whose investments are pooled across the scheme membership, with associated individual member holdings taking the form of projected pension entitlements. Future pension increases and, if necessary, projected pensions themselves, are adjusted up or down annually, to ensure that the scheme is always fully funded.

An annual valuation in this model is carried out to determine the scheme's funding level. This valuation follows an iterative process, as any or all of the following items are adjusted, until the value of assets and liabilities are equal:

- The level of current and assumed future increases to pensions in payment;
- The level of pre-retirement current and assumed future increases on projected pensions not yet in payment;
- The level of post-retirement current and assumed future increases on projected pensions not yet in payment; and
- Projected pensions of those members who have not yet retired.

At any time before retirement, projected pensions can theoretically be increased or reduced, depending on the scheme's experience (mainly investment performance).

At retirement there are two potential options for decumulation. In the first a nominal annuity is purchased in the member's name. Future pension increases are not secured; instead, in subsequent years, a single year's post-retirement pension increase shown to be possible as part of the annual valuation is purchased as an additional annuity in the member's name. In the second decumulation approach, pensions on retirement, and any future increases, are paid out of the scheme's fund. This is known as 'self-annuitisation'.

4 Description of modelling approach

Risk and uncertainty are inherent features of both CDC and standard DC and this has been captured in the analysis through the use of *stochastic* modelling. A stochastic model generates thousands of different projections of pension outcomes, with the assumptions used for each projection generated by an underlying economic model designed to mimic the way financial markets and economic variables such as inflation and interest rates operate in reality. By analysing the range of answers produced, the stochastic model can then ascribe probabilities to any given outcome.

The modelling described in this annex uses projections of 10,000 scenarios per year over a 100 year projection period. The projections provide future distributions in every year for inflation, interest rates, and yields and returns on equities, bonds and property. The modelling uses this information along with assumptions on salary levels and growth, pension contributions, asset allocation and costs to calculate 10,000 different pension outcomes in each year of the 100 year projection period.

GAD has modelled both the CDC scheme design described above and a standard DC scheme for comparison. In both cases contribution periods and rates and asset allocations are the same. This means that any difference in the projected pension prior to annuitisation is due solely to the design of each scheme.

The main analysis was conducted on a 'central' variant of the model with the following characteristics:

- Both pensions and pension increases are reserved for on an estimated buyout basis for CDC; in the standard DC scheme index-linked annuities are bought out with an insurer on retirement;
- The scheme starts with 100 per cent of members being active. There are 250 members in each age group, ranging from age 18 to 65;
- The level of active membership in the scheme remains constant over time so that exits are exactly balanced by new entrants;
- Each active member is identical with an annual starting salary of £30,000 and annual salary growth of 1.5 per cent in real terms;
- There is a fixed total contribution of 10 per cent of salary per member each year;

Modelling Collective Defined Contribution Schemes

- The CDC scheme is invested 100 per cent in equities over its lifetime. Members in the DC scheme are invested 100 per cent in equities up until five years prior to retirement, at which point they begin a gradual shift into bonds and cash, such that by age 65 they are fully invested in these less risky assets, a strategy known as 'lifestyling';
- In terms of costs², allowances of £100 per member and £25 per member for scheme administration have been made in the CDC and DC case respectively, while investment management charges have been set to 30 basis points for CDC and 90 basis points for DC.

In addition GAD considered the performance of both schemes in a number of different variants in order to investigate the performance and viability of CDC under different conditions. The main alternative variants were as follows:

- Self-annuitisation – As central variant but CDC pensions and increases continue to be paid from the scheme rather than being bought out with an insurer;
- Conservative investment strategy – As central variant but with a more cautious investment strategy³ in both CDC and DC⁴;
- No new entrants – As per the conservative investment strategy variant, but with no new entrants, so that active membership diminishes over time, and no lifestyling for standard DC.

² Assumed levels of costs and charges have been set with reference to DWP research report no. 535, 'Costs of running pension schemes: findings of a feasibility study' (DWP, 2008).

³ 50 per cent equities, 5 per cent property, 15 per cent corporate bonds, 15 per cent nominal gilts, 10 per cent index-linked gilts and 5 per cent cash.

⁴ DC continues to retain the five year lifestyling component.

5 Results

5.1 Level of returns for members under CDC schemes

A CDC scheme is expected to produce a pension pot around 25 per cent higher than a conventional DC pension because:

- A CDC scheme does not lifestyle, so remains invested in higher yielding, riskier investments for longer. The model assumes an equity risk premium⁵ of 4 per cent per annum, so a 100 per cent equities strategy would on average outperform a five year lifestyle strategy by a cumulative 10 per cent or so.
- On a member's retirement, a flat-rate annuity is bought⁶ but the funds to secure future increases remain invested in higher yielding assets. In comparison, an index-linked annuity would be backed by gilts and corporate bonds, with lower risk but lower return which would be reflected in the rates offered. If, for example, one third of the full index-linked buyout cost remains invested in equities for a further 10 years on average, this would produce an additional return of 10 – 15 per cent on average.

The modelling shows that at the median under both scheme types in the central variant, CDC is expected to deliver a retirement outcome over the individual's lifetime that on average⁷ is 39 per cent higher than the corresponding DC outcome.

For the variant with no new entrants, the median CDC outcome over the individual's lifetime is on average 4 per cent higher⁸. This suggests that actual relative levels of pension benefit would be dependent on the degree to which the scheme continues to have a stable active membership.

The self-annuitising variant would be expected to produce higher median outcomes for CDC in comparison to the central run because the assets remain within the scheme and are not used to buy out pensions. The variant with the conservative

⁵ The additional return on average to holding equities over cash or bonds.

⁶ This refers to the central variant. In the self-annuitising variant, no flat rate annuity is bought out, so the expected additional return would be even higher than the central variant as more assets are retained within the scheme.

⁷ In practice the modelling produces results for the ratio of income at age 65 and age 87 (the age of expected death). So the result described in paragraph 13 is the average of the ratio of benefits at age 65 and age 87. For the central variant the median CDC benefit is 59 per cent higher at age 65 and 20 per cent higher at age 87, meaning that median income over the lifetime is on average 39 per cent higher under CDC.

⁸ The median CDC outcome is 17 per cent higher than standard DC at age 65 and 8 per cent *lower* than standard DC at age 87, with the average over the lifetime being 4 per cent higher under CDC in the median outcome.

investment strategy would result in a median CDC outcome lower than the central run.

All the variants exhibit a decline in relative income from CDC through retirement, meaning that median pension increases do not keep pace with inflation. This will be examined in more detail in the next section.

Focusing on the median obscures the risk that the pension fund could perform badly - in practice there is a wide range of possible retirement outcomes under both CDC and standard DC. However, even when the tough conditions of the no new entrants scenario are imposed on CDC it outperforms standard DC in more than 50 per cent of the scenarios.

5.2 Predictability of income in retirement in CDC schemes

The modelling indicates that an individual's pension at retirement in a CDC plan is subject to less volatility than in a standard DC plan; for members age 30 at the outset of the simulation, the standard deviation of pension outcomes across the scenarios modelled is 18 per cent lower under CDC in comparison to standard DC. For members age 50 at the start of the simulation the standard deviation of outcomes under CDC is 40 per cent lower than under standard DC.

However there continues to be significant volatility in absolute terms in CDC. In the modelled CDC scheme, increases to deferred pensions and pensions in payment are granted only when the scheme is sufficiently well funded. If the scheme's finances are in poor health projected pensions can be reduced and pension increases foregone. Cuts in projected pensions and/or foregone indexation (particularly for younger members) are an integral way of managing risk in a CDC scheme.

5.2.1 Likelihood of cuts in projected pensions

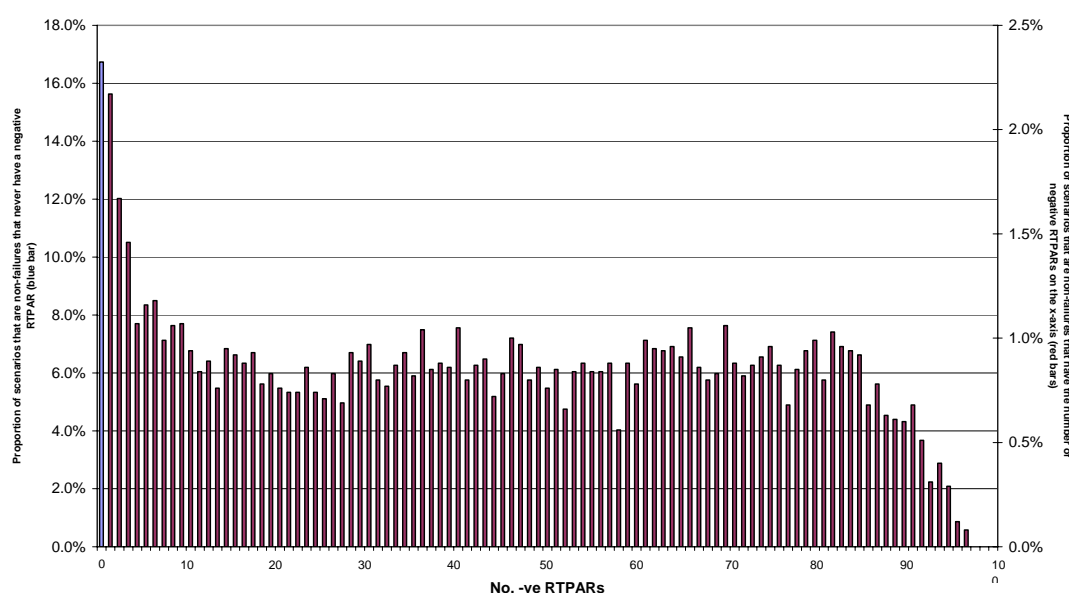
Table 1 shows, for each variant, the proportion of scenarios that result in no cuts to projected pensions being made over the 100 year projection period.

Table 1: Proportion of scenarios without cuts to projected pensions

Variant	Proportion of scenarios without cuts to projected pensions
Central	16%
Self-annuitising scheme	28%
Conservative investment strategy	41%
No new entrants	52%*

Source: GAD. *Note that for the no new entrants variant, the proportion refers only to those scenarios where the scheme does not fail.

In the central case just over 16 per cent of all scenarios result in no cuts⁹ being made to projected pensions over the 100 year projection period. Of the remaining approximately 84 per cent of scenarios, there is at least one instance (i.e. one year) of a cut to members' projected pensions, with the distribution of cuts shown in chart 1.

Chart 1: Central variant – proportion of non-failing scenarios distributed by the number of cuts to projected pensions


Source: GAD

Chart 1 shows the frequency with which projected pensions are reduced in the central variant¹⁰. The first bar on the extreme left of the chart (read against the left-hand axis) shows that just over 16 per cent of the scenarios did not result in a cut to

⁹ Since CDC scheme valuation occurs once a year, cuts or increases to projected pensions and pensions in payment can only take place once a year. So the maximum number of cuts or increases to projected pensions and pensions in payment in the 100 year projection period is simply 100.

¹⁰ "RTPAR", as labelled on the horizontal axis of the chart, is the rate of revaluation / pension increase that ensures that the value of liabilities is equal to the value of assets.

projected pensions over the 100 year projection period, while the remaining bars (read off against the right-hand axis) show the proportion of scenarios that have the number of cuts on the horizontal axis over the 100 year projection period. For example, just over 2 per cent of scenarios have one cut in projected pensions over the 100 year projection period, around 1.7 per cent of scenarios have two cuts to projected pensions over the 100 year projection period etc. with a small proportion of scenarios having more than 85 cuts to projected pensions in the 100 year projection period.

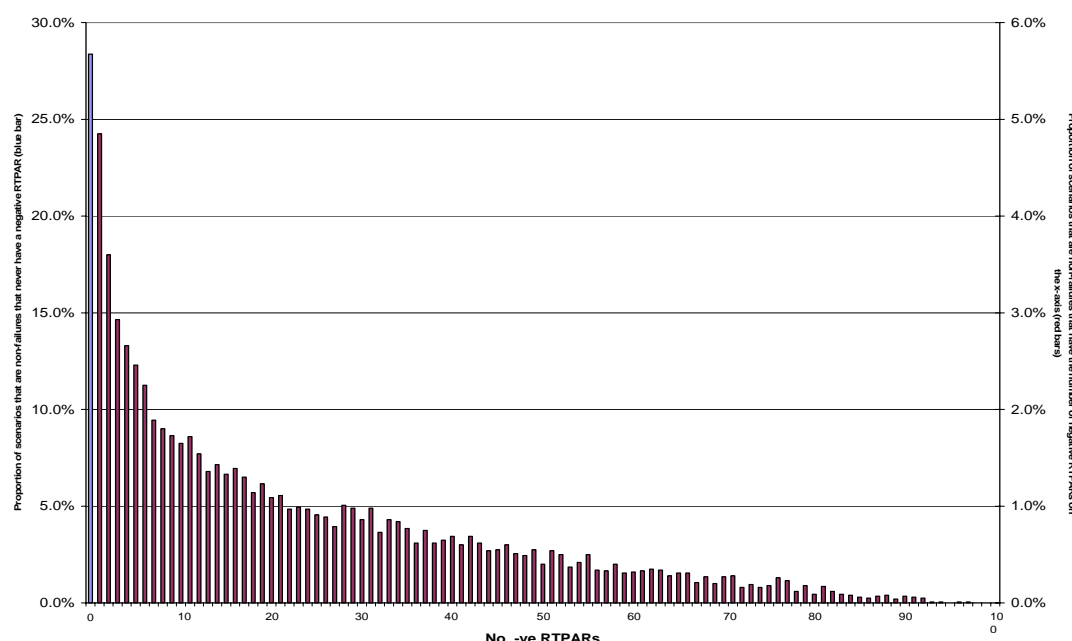
The chart indicates that, broadly speaking, there are as many scenarios with a low number of cuts to projected pensions as there are with a high number of cuts. Given investment volatility, it is reasonable to expect that over a 100 year period there would be some cuts in projected pensions, but what constitutes an acceptable amount of cuts is a subjective point.

However, the other variants do show that it is possible to reduce the instances of cuts and make members' projected pensions less volatile (at least on the downside). In the self-annuitising scheme, the fact that benefits are not bought out means that more assets continue to be held in the scheme, thus continuing to earn a return which can continue to be used to smooth outcomes over time (albeit with a continuing risk of unexpectedly poor investment returns). When pensions are bought out assets leave the scheme and if the scheme subsequently suffers a negative investment shock, the level of assets in the scheme will be lower than would have been the case had the pensions not been bought out. This is true even allowing for a fall in asset values if pensions had not been bought out. As well as having a higher proportion of scenarios with no cuts than the central case, for the scenarios where there are cuts, the distribution is heavily skewed towards a relatively large proportion of scenarios where there are a few cuts and a much smaller proportion where there are larger numbers of cuts (see chart 2).

It is worth noting that this apparent improvement in outcomes is not achieved without cost; by paying pensions from the fund, the scheme continues to bear the risk that its members will live longer than expected, meaning that pension payments could have to be made over a longer time period. In contrast, buying pensions out means that this risk is transferred to the insurer paying out the pension annuities.

The variant with the more conservative investment strategy also results in a less volatile projected pension because less risky investments are being made. The likelihood of any cuts in projected pensions is consequently reduced, and where cuts do occur, they are generally few in number – the distribution of cuts looks very similar to that in chart 2. However, it is important to note that the reduction in volatility in this instance is achieved at the expense of a lower benefit than in the case of the central run; this simply reflects the risk-reward trade-off inherent in investment choice.

Chart 2: Self-annuitising variant – proportion of non-failing scenarios distributed by the number of cuts to projected pensions



Source: GAD

The variant where there are no new entrants provides some rather misleading results in respect of cuts to projected pensions. The distribution of cuts to projected pensions includes only *non-failing* scenarios (see below) and is highly skewed such that most non-failing scenarios result in no or only a handful of cuts to projected pensions, which is another way of saying that when the scheme's investment experience is broadly positive projected pensions are generally not cut very often. This is not surprising. However when investment returns are highly negative, many of the scenarios result in the scheme failing altogether (see below). Because the distribution of cuts to projected pensions is based only on non-failing scenarios (which are generally only those where the investment experience has been good) the distribution of cuts appears highly favourable; but this is an artificial result since so many scenarios have resulted in outright scheme failure.

5.2.2 Magnitude of increases and cuts to projected pensions over time

When considering the volatility of a CDC pension, as well as the likelihood of any cuts to projected pensions, it is useful to see how big such cuts (and increases) are. This section focuses on the so-called 'balancing item', which in this model is used annually to adjust liabilities such that they are always equal to assets. The balancing item is defined as the per annum compound rate of increase or decrease applied to projected pensions before and after retirement, to ensure that assets are always equal to the liabilities.

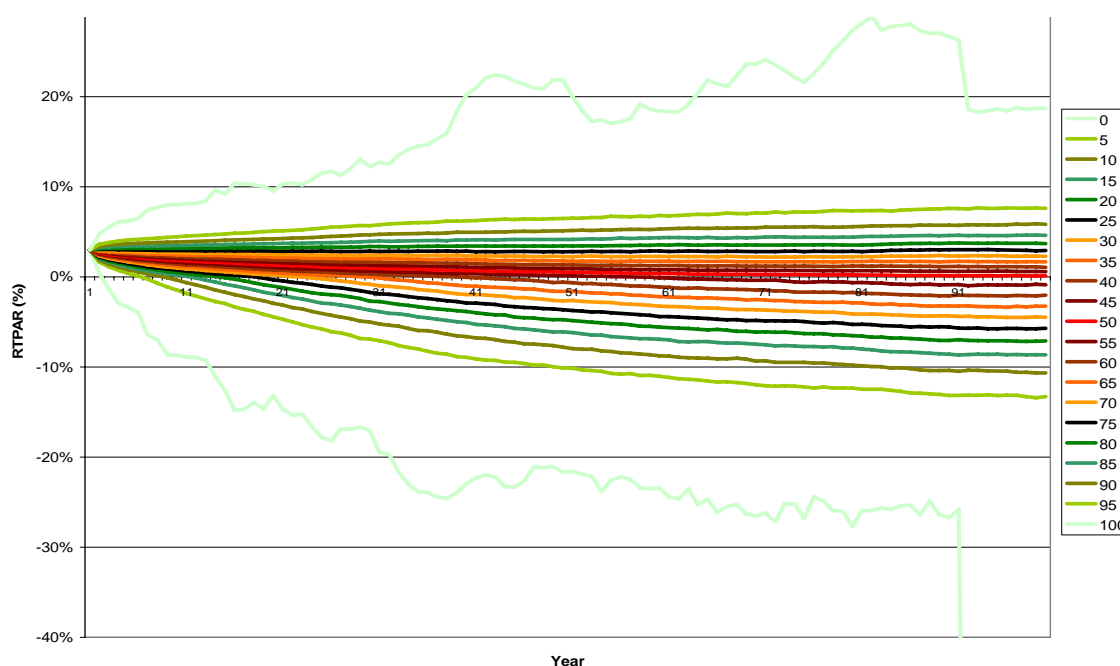
Modelling Collective Defined Contribution Schemes

The design of the scheme modelled by GAD means that for members who have yet to retire, projected pensions could be increased or decreased. For pensioners, the benefit cannot be cut, although future increases do not have to be paid in the event of adverse investment outcomes.

Chart 3 shows the percentile distribution¹¹ of annual pension increases or decreases over the 100 year projection period for the central variant. The chart indicates that 90 per cent of the scenarios (between the 5th and 95th percentiles¹²) result in adjustments to projected pensions in the range -15 per cent per annum to +7.5 per cent per annum.

Around 45 per cent of the time projected pensions (of active and deferred members) or pensions in payment are either not indexed¹³ (pensioners and non-pensioners) or reduced (non-pensioners only) by up to 15 per cent per annum, and around 45 per cent of the time projected pensions and pensions in payment are increased by up to 7.5 per cent in any year. This confirms that CDC schemes do still exhibit considerable volatility in absolute terms.

Chart 3: Central variant – behaviour of the balancing item over time



Source: GAD

¹¹ The percentile approach means that all 10,000 scenario results for any given year are ordered from smallest to largest; the 5th percentile, for example, is the scenario that is 5 per cent of the way along in that order.

¹² The top and bottom 5 percentiles are generally ignored as they typically reflect rather extreme outcomes.

¹³ Essentially an 'increase' of 0 per cent.

Modelling Collective Defined Contribution Schemes

The median value of the balancing item declines over time, from an initial target of matching inflation, towards zero, meaning that over time there is a declining likelihood of any increases to projected pensions and pensions in payment and a correspondingly greater likelihood of cuts to projected pensions. This is due to investment volatility. Even under fairly routine investment conditions, with the modelled scheme and target pensions, a steady state of active membership is not expected to be sufficient to provide any revaluation of projected pensions or increases to pensions in payment in the long run.

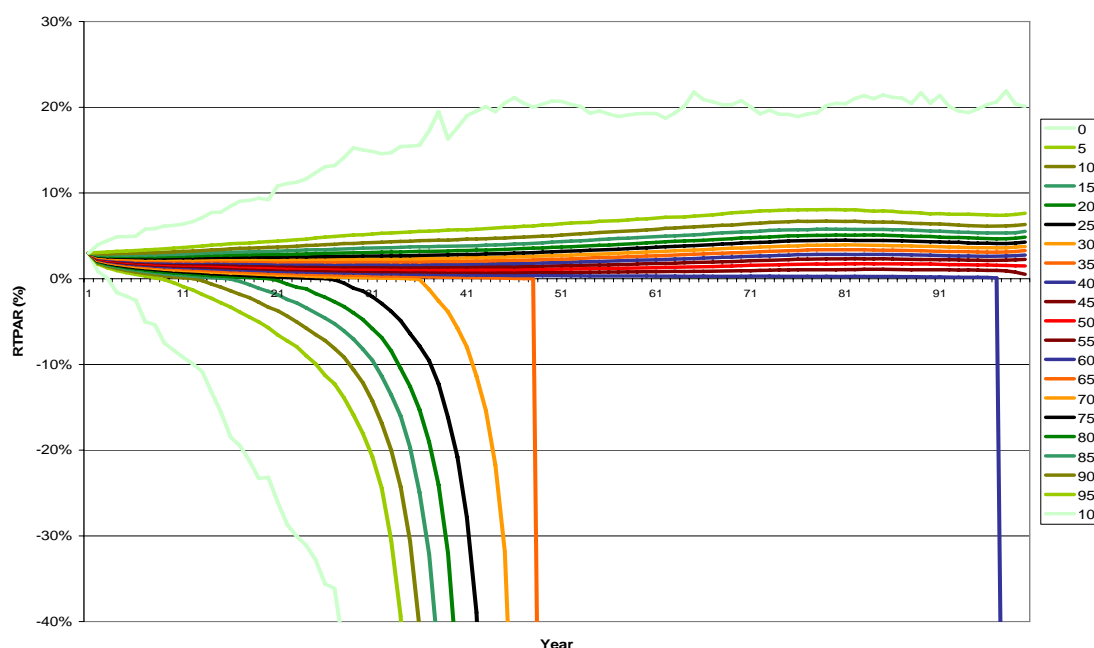
The chart also indicates that the magnitude of increases even in the best scenarios is significantly less than cuts in the negative scenarios. In 90 per cent of scenarios cuts are as large as 15 per cent per year, but increases only as high as 7.5 per cent per year. This arises because pensions in payment in this model cannot be cut meaning that cuts are only shared amongst active and deferred members. Increases have to be shared amongst all three groups of members, so the benefits of strong investment returns are spread amongst a larger group. This represents a cross-subsidy from active and deferred members to pensioner members.

The other variants provide some interesting results. The self-annuitising scheme actually sees a slight increase in the median level of balancing item over time, so that there is a greater likelihood of benefit increases as time passes. The distribution also improves over time, with a smaller range of outcomes; 90 per cent of scenarios result in annual adjustments in the range -8 per cent to around +12 per cent. This reflects the fact that assets are retained within the scheme rather than used to buy out a pension, and that they earn an additional return.

The conservative investment strategy variant has a median balancing item at the level of inflation that is roughly constant over time, with a much tighter distribution – 90 per cent of scenarios result in annual adjustments in the range -5 per cent to +5 per cent. This is achieved by reduced volatility from holding less risky assets.

The case where there are no new entrants actually sees the balancing item maintained at the level of inflation in the median outcome, but outcomes below the 35th percentile fall away precipitously from around the twentieth year of the projection as active membership begins to decline (see chart 4). This dramatic fall reflects the ever-decreasing size of the group amongst which risk can be pooled. The implication is that a large and diverse active membership helps to reduce volatility by increasing the number of members amongst which risk can be shared.

Chart 4: No new entrants variant – behaviour of the balancing item over time



Source: GAD

5.3 Intergenerational transfers in CDC schemes

It has already been highlighted that there is a cross-subsidy from active and deferred members to pensioners in the central variant since pensions in payment cannot be cut. This means that active and deferred members bear greater investment risk since the impact of poor investment returns is unlimited for these two member types, whilst it is limited for pensioners.

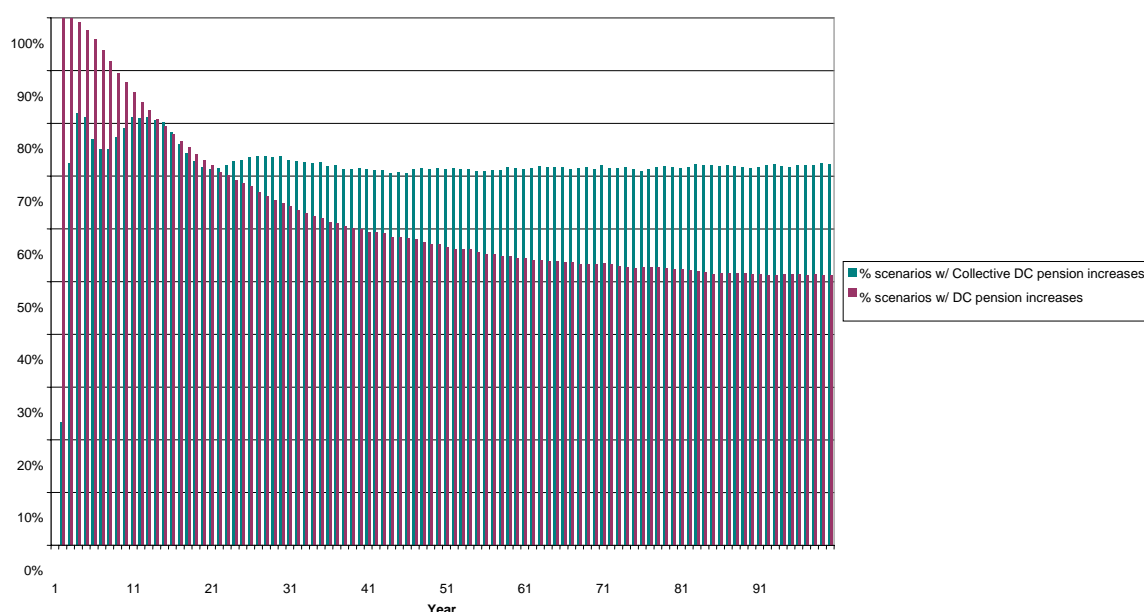
In addition, a further cross-subsidy exists between earlier and later cohorts of retirees (with the modelled scheme and target pensions). This arises because the likelihood of pension increases being paid decreases over time as the balancing item becomes negative more often. The first few cohorts of pensioners under CDC schemes are effectively locking-in pension increases at the expense of future generations of retirees. This phenomenon is illustrated in chart 5 in the case of the central variant.

The chart shows the proportion of the 10,000 scenarios in each projection year that result in pension increases being awarded under both scheme types. The red bars represent the proportion of scenarios resulting in CDC pension increases, while the blue bars represent the proportion of scenarios resulting in DC pension increases. Since the modelling assumes that the DC pension is inflation-linked, the blue bars simply reflect the proportion of scenarios where inflation is positive.

Modelling Collective Defined Contribution Schemes

The chart shows that initially all of the 10,000 scenarios result in a pension increase under CDC, but that this declines steadily over time and by the end of the 100 year projection period only around half of the 10,000 scenarios result in a pension increase under the Collective DC design. In contrast, the standard DC design results in pension increases in at least 70 per cent of the 10,000 scenarios for nearly every year in the 100 year projection period. So it is clear that under the modelled CDC scheme earlier generations have a stronger likelihood of receiving higher pensions at the expense of future generations.

Chart 5: CDC cross-subsidies in the central variant - Percentage of scenarios resulting in CDC pension increases vs. DC pension increases each year



Source: GAD

It could be argued that it is not appropriate to assess CDC schemes on the basis of intergenerational fairness, because the inherent intergenerational transfers at the core of DB schemes are not questioned by members. However, the problem of such transfers occurring in CDC schemes is that members' benefits are not guaranteed. This makes the transfers potentially more obvious and could lead to some people receiving a lower than expected pension whereas previous generations had seen their expectations fulfilled.

The other variants modelled show some differences in this regard. In the self-annuitising scheme although there is an initial fall in the proportion of scenarios with CDC pension increases (from 100 per cent of scenarios to around 75 per cent by year 30), in the long term 80 to 90 per cent of scenarios receive pension increases, which is considerably better than the central case. Once again this reflects the

advantage of holding additional assets in the scheme rather than using them to buy out pensions.

The conservative investment variant also fares better than the central case; although the proportion of scenarios resulting in CDC pension increases declines steadily over time, the fall is less precipitous than in the central case, with 70 per cent of scenarios resulting in CDC pension increases by the end of the 100 year projection period. This is just a little less than the incidence of increases under standard DC.

The case with no new entrants is less insightful on this criterion. Although CDC fares slightly better than the central case, this is presumably because cases where the balancing item has been weak resulted in complete scheme failures, leaving the stronger scenarios to provide a slightly higher frequency of pension increases.

Cross-subsidies are inherent in the modelled CDC scheme. They have considerable implications for intergenerational equity. If these cross-subsidies become unfair and if this is understood by members, it might be difficult, in the absence of compulsion, to maintain high levels of active membership.

5.4 Stability of CDC schemes

CDC schemes require a steady inflow of member contributions to be sustainable over time in 100 per cent of scenarios. If this is not the case, when there are poor investment returns the scheme eventually fails¹⁴ due to a decreasing number of active members with which to share risk. However, failures occur only after the vast majority of members have left service and are already receiving pensions. Since in the model these pensions have been bought out with a third party insurer a scheme failure will not result in a pensioner losing their pension. They will, however, no longer receive any new pension increases and a small number of members may have seen deep cuts to their projected pensions pre-retirement.

An absence of new members coupled with poor investment returns can lead to a scheme failing, with some members (both active and deferred) being left with no assets at all. In the variant where there is an older membership with no new entrants this would have about a 1 in 3 chance of occurring over a 100 year period, with many schemes failing after about 50 years.

It is important to note that only the variant with no new active members results in scheme failures. This suggests that the CDC scheme is sustainable as long as active membership is maintained, although risk levels do increase as the level of membership falls.

¹⁴ Scheme failure means that the scheme either completely runs out of assets or it is impossible to alter members' projected pensions in such a way that scheme liabilities can be re-balanced to match assets.

Active members are important for two reasons. Firstly, they generate additional contributions. As the number of active members falls, the amount of money entering the scheme also falls, thereby reducing the flow of assets into the scheme and making cuts to projected pensions more likely. Secondly, since a CDC scheme works by sharing risk between members it is easy to see that as the number of individuals in the scheme declines there are fewer members with which to share risk, meaning that benefits become more volatile for those not yet drawing their pensions.

This is exacerbated by the fact that pensions in payment cannot be cut, so that the projected pensions of non-pensioner members become even more volatile as active membership declines. For pensioner members there is no volatility on the downside since their pensions have been bought out on retirement, but the likelihood of not receiving future pension increases is greater.

5.5 Reducing volatility in CDC schemes

It appears that CDC is somewhat less volatile than standard DC but it is possible to reduce this volatility further. The analysis above has shown that shifting to a more conservative asset allocation is the principal way of reducing volatility. Taking this step resulted in a smoother projected pension – a greater likelihood of increases, fewer cuts, and of a lower magnitude when they do arise. However, the removal of volatility comes at the expense of a smaller benefit, as with any DC arrangement. Furthermore, shifting to anything less risky than a 100 per cent equities strategy would seem to reduce the potential for higher returns in CDC schemes compared to DC schemes, as one of the key benefits of CDC schemes appears to be that the fund can hold riskier but higher returning assets for longer than an individual can.

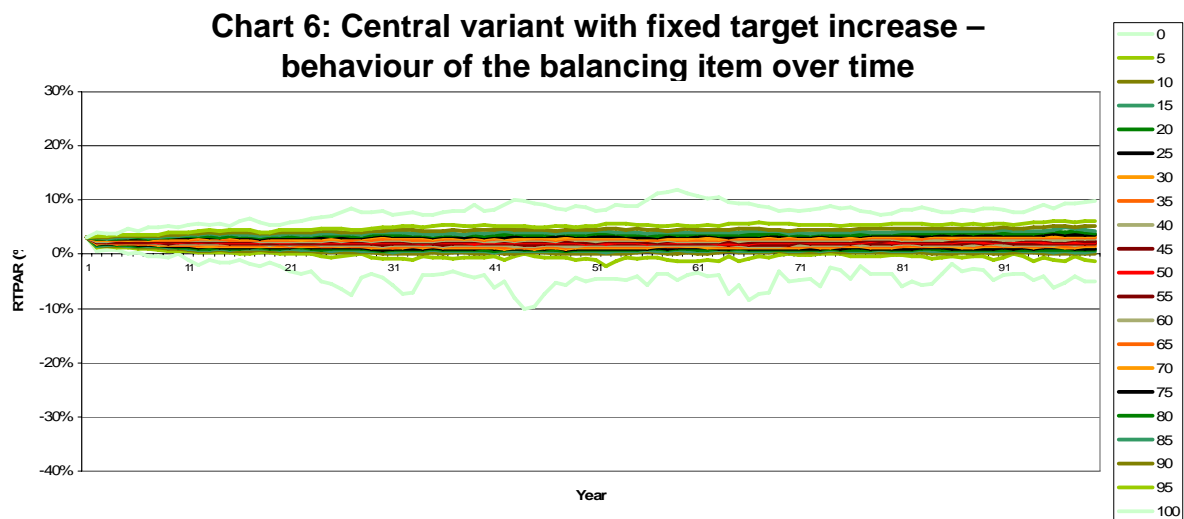
Another way to reduce volatility in CDC is to switch to targeting a fixed rate of pension increase rather than a floating increase linked to inflation and the level of available assets. This has quite striking effects. When the central variant is re-run using this fixed target increase¹⁵, the proportion of scenarios without cuts to projected pensions increases from 16 per cent to around 35 per cent and in the scenarios where there are cuts, the number of cuts is far fewer over the 100 year projection period.

There is a significant reduction in volatility as shown by the behaviour of the balancing item in chart 6, which illustrates that the distribution of the balancing item is much tighter. At the median, the balancing item declines from 3 per cent to 2 per cent over the 100 year projection period, in contrast to 0 per cent in the original run of the central scenario. Consistent with this reduction in volatility, there is now a much

¹⁵ An annual increase of 2.7 per cent is targeted, this being the level of inflation at the 60th percentile in the economic scenarios underlying the modelling.

Modelling Collective Defined Contribution Schemes

higher incidence of pension increases in CDC – across the 100 year projection period 90 to 95 per cent of scenarios see CDC increases every year, compared with a steady decline to around 50 per cent in the central case with floating target increases.



Source: GAD

6 Conclusions

The modelling results suggest that, on average, CDC schemes offer enhanced performance and some increased predictability of outcomes in comparison to DC schemes. However, there is significant doubt on the ability of such a scheme to manage risk in a way which is fair to different generations of scheme members and doubt remains on the extent to which the stability of CDC schemes is dependent on a continuing stream of member contributions.

