ONS Wealth and Assets Survey
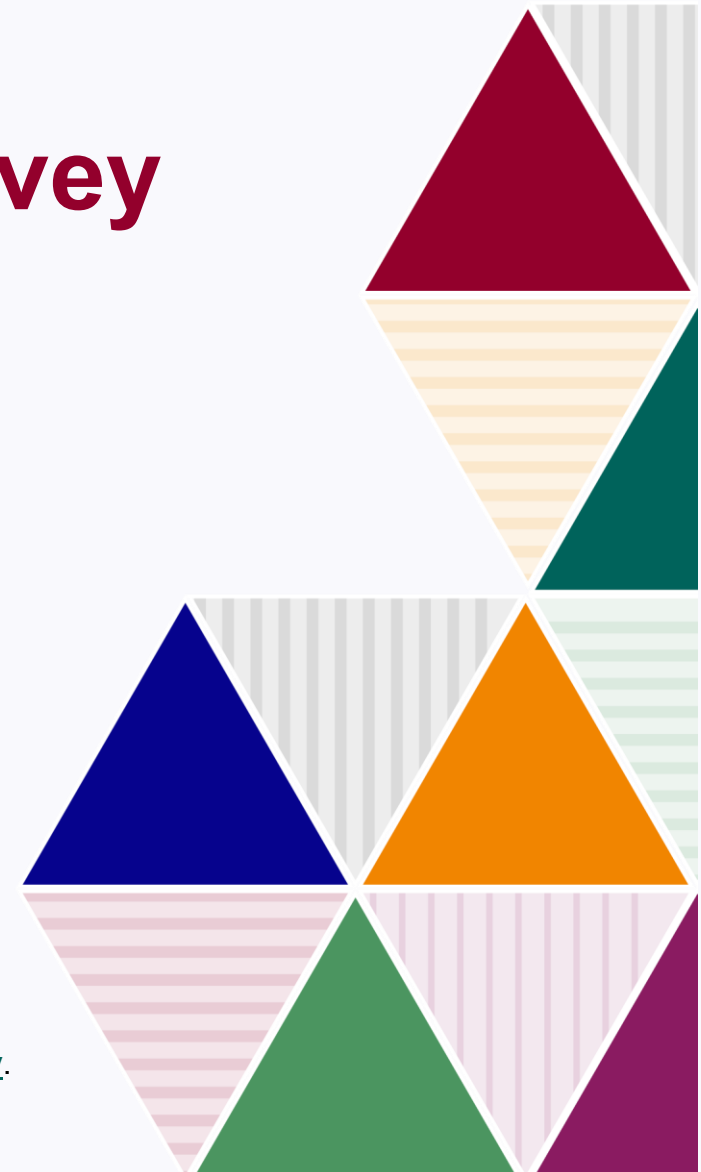
Valuing defined benefit pension wealth

5 December 2024

Chris Morley, FIA

Scott Madden, FIA

Contents

Introduction

Commission for GAD review

The Office for National Statistics ('ONS') produce and publish a biennial survey of the wealth and assets of households in Great Britain (the 'WAS'). The WAS is used widely across government to inform policy making.

Pension wealth is captured alongside property, physical assets and net financial wealth (e.g. savings). Pension wealth is split across two categories: pensions that are defined contribution ('DC') in nature, and pensions that are defined benefit ('DB') in nature.

ONS use a model to estimate DB pension wealth based on answers to household survey questions. This model is subject to public scrutiny and is currently being reviewed by ONS.

More information on the WAS and the current model used by ONS to estimate DB pension wealth is set out in Annex A.

As part of this review ONS have asked the Government Actuary's Department ('GAD') to support their review and make recommendations on:

- the discount rate to use in the model;

- how increases to pensions should be recognised in the model;

- what review processes would be appropriate to maintain the model going forwards;

- valuing DC pensions in payment wealth using the DB pensions model.

Limitations and compliance

Other aspects of ONS's model review, including a review of the questionnaire used to collect data for the model, are outside the scope of this paper.

Other than the ONS, no person or third party is entitled to place any reliance on the contents of this report, and GAD has no liability to any person or third party for any act or omission taken, either in whole or part, on the basis of this report.

This report, and the work undertaken to produce it, has been carried out in accordance with the applicable Technical Actuarial Standards: TAS 100 issued by the Financial Reporting Council ('FRC'). The FRC sets technical standards for actuarial work in the UK.

Objectives and recommendations

ONS objectives

The most suitable modelling approach will depend on the objectives of the model. The ONS's primary objective for the model is that it will produce outputs which reflect a true, un-biased, value of DB pensions wealth. ONS have also set out that they have the following objectives for this model:

Stability

- the model should minimise undue volatility in the value placed on the same DB pension wealth within and between rounds in order to capture the fixed (market immune) nature of a DB pension promise to a beneficiary

Consistency

- the model should use an approach to value DB pensions wealth which is consistent with the approaches used to determine the value of other wealth in the WAS

Practicality

- implementation: the ability to determine the model parameters (including annuities) while the data gathering process continues should be clear, simple and give unambiguous parameters
- interpretation: the model should produce outputs which can be readily interpreted by users of the WAS

Durability

- the model should be robust; model reviews should be unlikely to necessitate significant, frequent and/or onerous changes

Continuity

- the model should maintain consistency with the current approach insofar as possible
- any model changes should avoid large step changes in the WAS outputs where possible

The ONS have also confirmed that the stability objective is their most important objective, followed by the consistency objective. The practicality, durability and continuity objectives are more practical points which, while desirable, are of lower relative importance.

GAD recommendations

GAD's recommendations are set out below. Our analysis of the current model, our rationale for these recommendations and the impact of these recommendations is set out in the subsequent sections of this report.

1. GAD recommend that the model uses a consistent discount rate in all parts of the model to ensure coherence of the model.

2. Based on our understanding of the ONS objectives and relative priorities, GAD recommend that ONS use the SCAPE discount rate.

    GAD recommend that the SCAPE discount rate on the last day of the review cycle is used for all valuations of wealth within the cycle. For instance, Round 8 would use the SCAPE discount rate of 2.4% a year and Round 9 would use the current rate of 1.7% a year.

3. GAD recommend that the ONS model reflects that DB pension promises typically include some form of inflation protection before and after retirement.

4. GAD recommend that the ONS model uses a discount rate which is expressed in real terms, both before and after retirement.

5. GAD recommend that ONS take ongoing actuarial support on the operation of the model through each WAS.

6. GAD recommend the ONS adopt a full model review ahead of every third WAS, and monitor developments to initiate "out-of-cycle" reviews should major un-expected events occur (e.g. if the SCAPE methodology were fundamentally changed).

7. GAD recommend that the DB pensions wealth model and other recommendations in this report can be justified to value DC pensions in payment wealth in "Round 8".

Discount rate

The need for a discount rate

When placing a value on a DB pension promise a discount rate is needed to discount future pension promises back to a current value.

When valuing a DB pension the choice of discount rate is typically the most impactful modelling decision in terms of the value placed on the DB pension. The discount rate will affect the value placed on a future DB pension benefit *today* but not the amount of the DB pension benefit itself.

No single discount rate approach will achieve the best outcomes for all of ONS's objectives and therefore the most suitable discount rate will depend upon ONS's relative balance of priorities between these objectives.

Possible discount rates

There are many possible discount rates that could be used in the model. These include gilt yields (index-linked or nominal), discount rates inferred from the price of pension products in the open market, statutory money purchase illustration ('SMPI') discount rates, HM Government Green Book discount rates, private pension scheme funding discount rates, the Superannuation Contributions Adjusted for Past Experience ('SCAPE') discount rate used in the valuations of public service pension schemes and pensions accounting discount rates.

GAD have considered a range of discount rate approaches and how they align with ONS's objectives. In Annex B GAD have set out different discount rate approaches that meet ONS's primary objective; this annex also sets out GAD's red-amber-green assessment of these approaches against the ONS's other objectives.

Different discount rates can vary by form and structure, however most approaches can be categorised by whether or not they are market related. Further detail on the use of discount rates to place a value on DB pensions is included in Annex C.

Market related discount rates can change often (in some cases with considerable daily fluctuations). Such volatility can have potentially material impacts to present value assessments of pensions. In contrast discount rates which are not market related tend to be more stable but will be for a specific purpose and the process by which they have been determined will have involved some degree of judgement.

The current model uses the SCAPE discount rate, which is not market related, before retirement and discount rates implied from annuities (broadly a gilt yield discount rate referencing market pricing) after retirement.

Impact of discount rate change

No discount rate can give the best outcome against all of ONS's objectives. Against some objectives the non-market related discount rates will be better than market related discount rates (e.g. stable within/between rounds) while against others market related discount rates will be better (e.g. consistent with other market related wealth). The next page sets out our recommended discount rate and how it compares to ONS's objectives.

When making assumptions to value pensions promises, the values are typically most sensitive to the discount rate used. If ONS choose to adopt GAD's recommendations, then the model outputs will change significantly. To illustrate this the GB total DB pension wealth under the current model, and with moves to SCAPE (non-market related) or gilts (market related) discount rates, is set out in the Impact on GB total DB pensions wealth section; please note that these illustrations also assume that GAD's recommendations on pension increases are adopted.

A move to the HM Government Green Book discount rates would produce even larger reductions in total wealth than a move to SCAPE. A move to corporate bonds or SMPI discount rates has not been assessed as these two approaches were generally less favourable when assessed against all the objectives (see Annex B).

Recommended discount rate

Recommendation 1
GAD recommend that the model uses a consistent discount rate in all parts of the model to ensure coherence of the model.

This approach satisfies the ONS's primary objective that the model adopted will produce outputs which reflect a true, un-biased, value of DB pensions wealth.

Using different discount rate approaches pre- and post-retirement (hybrid approaches) such as the current approach, could satisfy some of ONS's objectives in part. However, this would undermine the coherence of the overall model. The ONS's objectives are not expressed differently pre- and post-

retirement and so GAD do not recommend adopting a hybrid approach.

Recommendation 2
Based on our understanding of the ONS objectives and relative priorities, GAD recommend that ONS use the SCAPE discount rate.

GAD recommend that the SCAPE discount rate on the last day of the review cycle is used for all valuations of wealth within the cycle. For instance, Round 8 would use the SCAPE discount rate of 2.4% a year and Round 9 would use the current rate of 1.7% a year.

The stability objective outlined by the ONS sets out the preference for a model that recognises that a defined benefit promise to a beneficiary is not affected by market changes. From the beneficiaries' perspective the pension entitlement is fixed.

By satisfying the primary objective and the stability objective, the SCAPE discount rate approach is the methodology that best aligns with ONS's priorities, and GAD therefore recommend it. A fuller analysis of different approaches is included in Annex B, an illustration of the evolution of the SCAPE rate and the real gilt yield can be found in Chart 3 in Annex C.

Publishing multiple WAS results using more than one discount rate approach was considered but this contradicts the interpretation aspect of the practicality objective (many users would be unlikely to be able to decide which WAS to use). Therefore we do not recommend this approach.

Pension increases

Inflation protection in DB pensions

DB pension promises typically include a promise to increase the pension amount in payment (or amount accrued when not in payment) by inflation each year to protect the purchasing power of that pension.

The nature of this indexation varies across the private and public sectors, between schemes and whether the pension is in payment or not. Further detail on how pension promises typically recognise inflation is set out in Annex C.

The current model allows for inflation increases to pensions after retirement, but no increases to pensions before retirement. More detail on the current model is set out in Annex A.

Without recognition of increases to promised pensions before retirement the model's outputs do not reflect a true value of DB pensions wealth (part of ONS's primary objective).

Recommendation 3
GAD recommend that the ONS model reflects that DB pension promises typically include some form of inflation protection before and after retirement.

Modelling inflation protection

Discount rates can generally be expressed in "nominal" or "real" terms. Real discount rates implicitly allow for inflation protection and nominal rates can be expressed as an inflation assumption plus a real discount rate assumption. Further detail on nominal and real discount rates is set out in Annex C.

The current model expresses nominal rates before retirement as a real discount rate plus inflation. The inflation assumption used in the current model is a retrospective measure of inflation in the year up to the month in which the data is collected at interview. This approach produces significant volatility in the inflation assumption within and between rounds.

The inflation assumption applies to pension promises payable many decades into the future and so determining it in this way is not a technically coherent approach and does not align with ONS's objectives (e.g. to reflect a true value of DB pensions wealth or the stability and practicality objectives).

Recommendation 4
GAD recommend that the ONS model uses a discount rate which is expressed in real terms, both before and after retirement.

Consequences of recommendations

Adopting *Recommendations 3 and 4* would:

a) satisfy ONS's objectives
b) remove the need to determine a separate inflation assumption before retirement (addressing our concern about how this is currently set)
c) capture the range of different approaches taken by different schemes to indexation in a "one-size-fits-all" manner (the current model also does this)
d) produce higher estimates of pensions wealth for those who have not retired yet and with a larger proportionate impact the younger the person is (higher than not adopting these recommendations)

Model reviews

The changes to the model that we are recommending, and the model itself, are inherently actuarial in nature. The model includes annuities to determine the value of pension payments after retirement. The calculation of annuities to determine the value of pension being paid (or due to be paid) in retirement is common actuarial work.

Recommendation 5
GAD recommend that ONS take ongoing actuarial support on the operation of the model through each WAS.

GAD's recommendations have been made with the ONS's durability objective in mind. However, it is never possible to anticipate all future changes and it is general good modelling practice to keep models under regular review.

An appropriate timeframe for future reviews inevitably involves a large degree of pragmatism when making such a judgement. Too frequent changes caused by regular review can undermine the consistency of outputs between rounds. On the other hand, reviews that are too infrequent can eventually lead to models becoming unfit for purpose.

Given the WAS is a two-year process, a reasonable cycle for model reviews may be to carry a full model review every third round. However, ONS should remain alert to any wider economic or other developments that might mean an immediate review is needed.

Recommendation 6
GAD recommend the ONS adopt a full model review ahead of every third WAS, and monitor developments to initiate "out-of-cycle" reviews should major un-expected events occur (e.g. if the SCAPE methodology were fundamentally changed).

If ONS adopt this recommendation that would produce the following review timetable:

	Period	Review
Round 7	1 April 2018 – 31 March 2020	
Round 8	1 April 2020 – 31 March 2022	Yes
Round 9	1 April 2022 – 31 March 2024	
Round 10	1 April 2024 – 31 March 2026	
Round 11	1 April 2026 – 31 March 2028	Yes
Round 12	1 April 2028 – 31 March 2030	
Round 13	1 April 2030 – 31 March 2032	
Round 14	1 April 2032 – 31 March 2034	Yes

The Aqua Book[1] encourages periodic reviews within its guidance on quality assurance for models used for analysis in government.

---

[1] Aqua Book, March 2015

DC pensions in payment

The source (DB or DC) of pensions in payment is not currently collected as a part of the survey.

Round 7 of the WAS suggests that, for the cohort before retirement age, wealth may be broadly evenly split across DB and DC; this is the oldest tranche for which DB and DC wealth is disaggregated. It is likely that for older cohorts the proportion of pension in payment from a DB source is higher given the recent historical trend away from DB provision.

This section explores the appropriateness of applying the DB pensions wealth model and the recommendations of this report to measure the wealth of defined contribution pension in payment for Round 8 of the WAS.

Sources of DC pension in payment

DC pensions in payment typically target a stable annual income and historically has been provided by an insurer. The majority of pensions in payment, whatever their origins, will therefore resemble DB pension.

Before 2015, DC pots were accumulated and invested over a working lifetime then, on retirement, used to purchase an annuity from an insurer. Once an annuity has been purchased a pension in payment with DC origins is not dissimilar to a DB pension in payment. Income is contractual in nature and intrinsically stable.

From 2015, under new "pensions freedoms" individuals were able to use DC pots on retirement in different ways. Individuals could defer the purchase of an annuity and/or draw down their income by disinvesting slowly under a "flexible drawdown" approach. This wider variety of approaches to funding retirement will mean that in some cases pension income will be less stable than a DB pension or annuity. For example, a retiree may take a flexible drawdown of income initially and then purchase their annuity later in retirement with their DC pot remaining exposed to market volatility after retirement.

Indexation of DC in payment

There is a wide range of indexation options purchased when DC pots are converted into pension in payment and in 2015 pensions freedoms created a wider spread of treatment of DC funds post-retirement.

When DC pots are converted into pension using an annuity purchase the retiree is typically offered a number of choices over indexation (or not).

Un-capped indexation arrangements will typically be offered at high prices by annuity providers due to all the risk the insurance company is then taking on. The mixture of arrangements in DB and DC pensions is likely to vary with more flat or fixed increasing pensions arising annuities purchased using a DC pot than those arising from DB pensions.

Nevertheless, the diversity of options available here will have similarity with the diversity of indexation offered by DB pension schemes.

Assessment against objectives

Given the ONS's objectives and relative priorities, the SCAPE approach is most suitable to assess pensions in payment.

There are many scenarios where an individual's perception of the source of their pension in payment, i.e. whether DC or DB in nature, will be unclear, and therefore assessing pension wealth in payment using the same approach whatever its origins also supports the consistency and practicality objectives.

Given the wide range of indexation of DC pensions in payment it is reasonable to take a pragmatic view and use the same approach to model all pensions in payment (similar to the pragmatism inherent in GAD's recommendations 3 and 4 noting the wide range of indexation terms for DB pensions in payment).

Recommendation 7
GAD recommend that the DB pensions wealth model and other recommendations in this report can be justified to measure DC pensions in payment wealth in "Round 8".

Implications of recommendation

Changing the discount rate for DC (as with the DB) will introduce a step change in the assessed present value. The charts in the next sections assume all pension in payment (including DC) is valued using the recommended model.

As the survey period moves further beyond 2015, the proportion of pension in payment related to drawdown of DC pots will increase and comparability with DB may become less valid. This approach may become less valid at future rounds and so should be kept under review.

Impact on GB total DB pensions wealth

Chart 1 below sets out the GB total DB pensions wealth in the last four waves/rounds of the WAS (generally around £4tn - £5tn out of total wealth of around £15tn) and illustrates how these vary under a SCAPE or gilts discount rate approach. This chart includes all pensions in payment wealth whatever its origin.
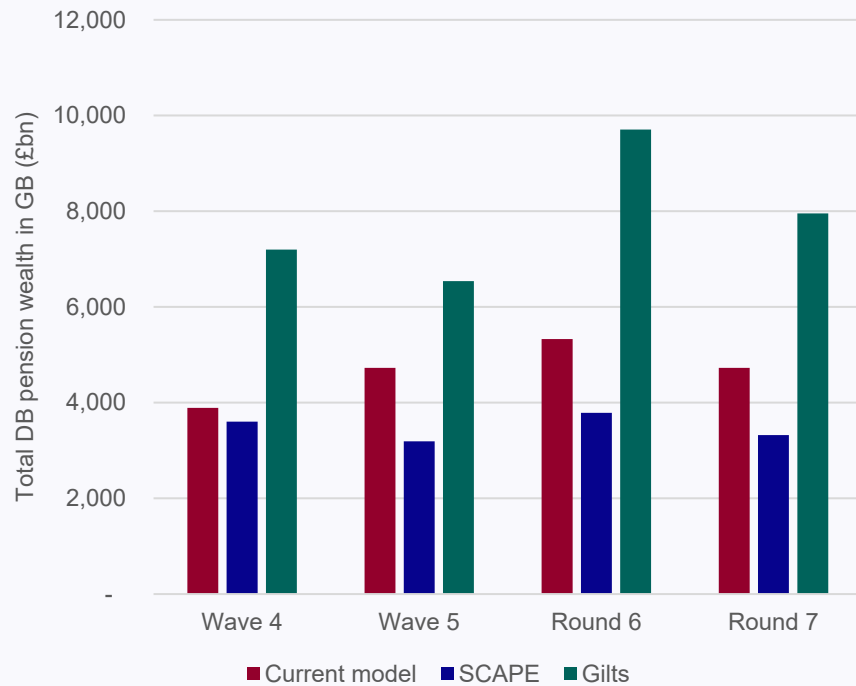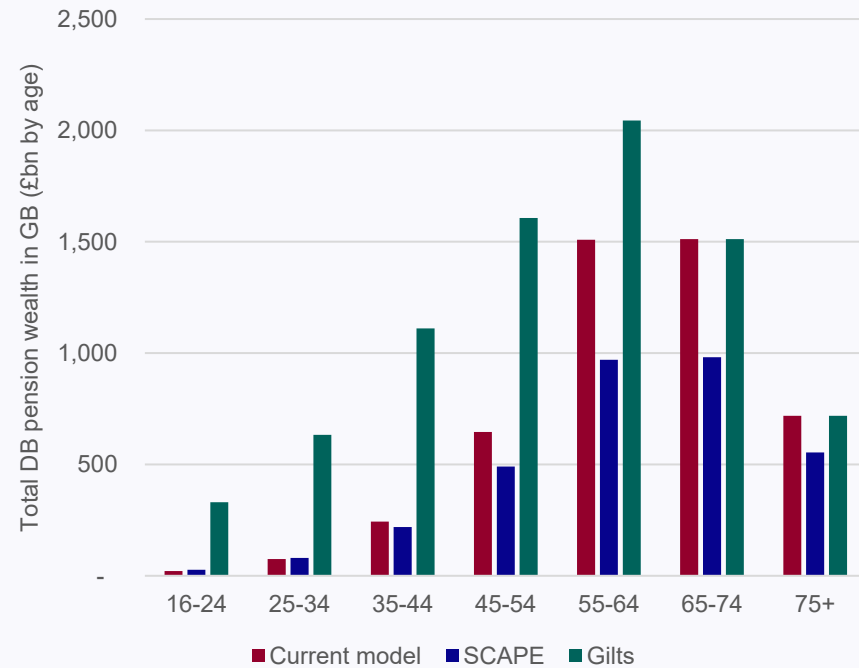
Chart 1: GB total DB pension wealth by round

use of SCAPE or gilts). For example, in Round 7 adopting a SCAPE discount rate (both before and after retirement) would have led to a 30% reduction in DB pension wealth. Using a discount rate based on index-linked gilts would have led to DB pension wealth being 70% higher. These percentages amount to a change of around £1.4tn or £3.2tn respectively.

The impact of the choice of discount rate also varies significantly depending on the age of the person with the wealth. Chart 2 below, shows the DB pension wealth across age groups for round 7 and how these vary by approach. This chart includes all pensions in payment wealth whatever its origin.

Chart 2: GB total DB pension wealth by age (Round 7)

Chart 1 illustrates the impact of the choice of discount rate (and assuming recommendations 3 and 4 are adopted alongside the

It can be helpful to consider the age group impacts illustrated in Chart 2 by starting with the impacts after retirement.

Age related impacts after retirement

For the age groups where most of the wealth is in payment, i.e. 65-74 and 75+, in Round 7, the impact of GAD's recommendation to use a SCAPE discount rate would have been a reduction in the measured wealth. This is because the SCAPE discount rate was higher than the gilt yield in Round 7.

Using a gilts approach in Round 7 would only have a minor effect on the wealth of those over 65 because the current model uses up-to-date market prices of annuities. These will generally be aligned to index-linked gilt yields.

Age related impacts before retirement

The impacts after retirement described above also affect the age-related impacts before retirement. Any wealth currently not in payment will eventually come into payment, the same model applies and the same impacts emerge.

However, the impacts after retirement are combined with further impacts before retirement as follows.

Adopting the SCAPE discount rate makes no difference to the discounting before retirement as that is the same as the current model. However there is an additional effect before retirement caused by our recommendation to allow for pre-retirement inflation. This recommendation in isolation, would have resulted in a higher statement of measured pensions wealth albeit that the effects of this are smaller than the post-retirement discount rate effects in Round 7.

Using a gilts approach in Round 7, would produce much higher measured value of wealth for age-groups before retirement (i.e. under 65). This is caused by the large decrease in the discount

rate that would have been used before retirement. The SCAPE rate and index-linked gilt yields since 2011 are illustrated in Annex C. In the period covered by Round 7 (April 2018 – March 2020) the index-linked gilt yield was much lower than the corresponding SCAPE rate. Since the period covered by Round 7 the index-linked gilt yield has increased significantly. The difference between the SCAPE approach and the gilts approach before retirement would be expected to be much smaller for Round 9.

The data, methodology and assumptions used to determine the illustrations on this page are set out in Annex D alongside the limitations of these illustrations.

Annex A: The WAS and the current model

Purpose of the WAS

The WAS is a biennial longitudinal survey that measures the well-being of households and individuals.

Households and individuals across GB are surveyed. WAS is used by a wide range of stakeholders to understand the wellbeing of households and individuals in terms of their assets, savings, debts and plans for retirement.

The WAS is a national statistic.

Funding for the survey is sourced from a consortium of the stakeholders, including the ONS, Department for Work and Pensions, HM Revenue and Customs and the Scottish Government.

The results of the WAS are used by the DWP, HMRC, ONS and other government departments such as the Department of Health and Social Care as well as users not part of government. The data can provide insights into the levels and distributions of wealth (and their constituent elements), including through analysis of different waves and rounds forming the timeseries.

History of the WAS

The WAS was launched in 2006 and has been held in biennial waves (or rounds) since.

Wave 1 was the output of interviews held with 30,000 households across two years from July 2006 to June 2008. This periodicity was retained until wave 5 (July 2014 to June 2016). Thereafter the survey covered two financial years, with round 6 covering the period April 2016 to March 2018.

The latest published WAS is round 7, published in January 2022, covering the period April 2018 to March 2020, sampling 17,500 households.
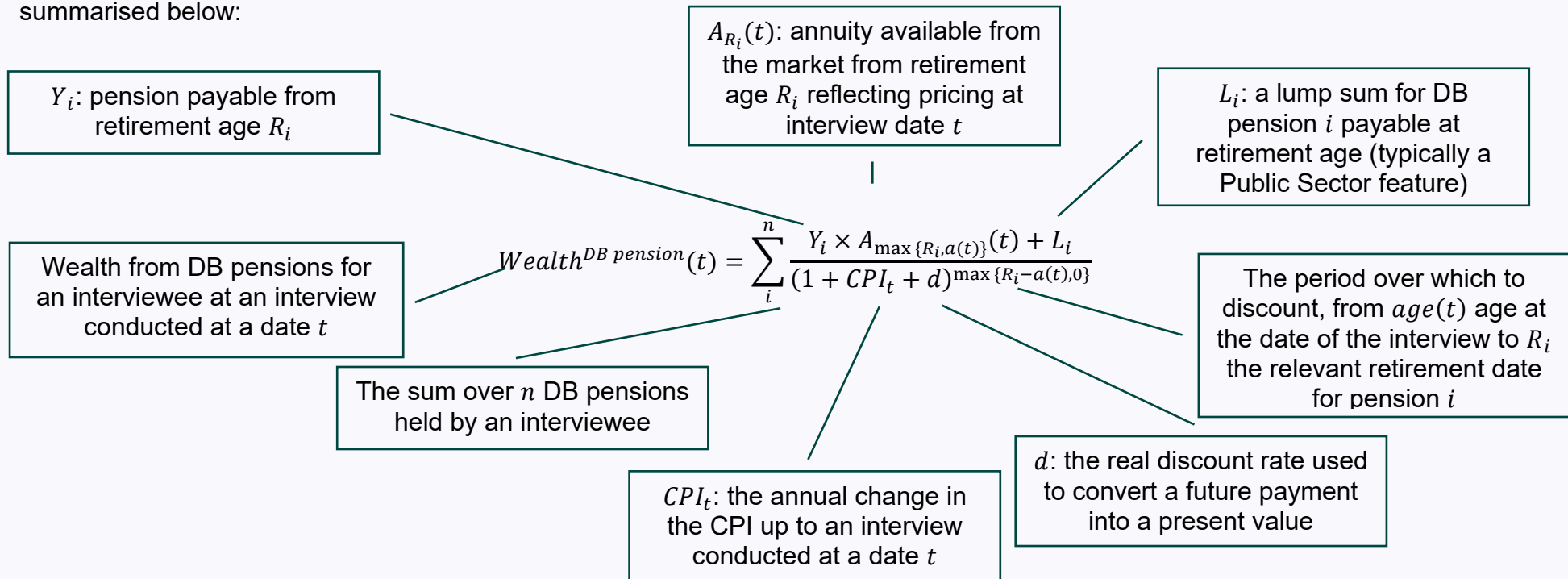
The current model used for placing a wealth value on a DB pension promise was adopted for Wave 3. Prior to this, the ONS had used a discount rate consistent with the yield available on high quality corporate bonds to convert a future pension promise into present value terms.

From Wave 3 the ONS adopted a discount rate aligned to the SCAPE rate, which at the time was 3.0% a year above CPI. Since then, HM Treasury have revised the SCAPE discount rate as follows:

Date change announced	Nominal SCAPE discount rate announced
23 March 2011	CPI + 3.0% a year
16 March 2016	CPI + 2.8% a year
29 October 2018	CPI + 2.4% a year
30 March 2023	CPI + 1.7% a year

Current model breakdown

The ONS have outlined the structure of their current approach to modelling DB pension wealth (i.e. the model used in Round 7), summarised below:

Y_i: pension payable from retirement age R_i

$A_{R_i}(t)$: annuity available from the market from retirement age R_i reflecting pricing at interview date t

L_i: a lump sum for DB pension i payable at retirement age (typically a Public Sector feature)

Wealth from DB pensions for an interviewee at an interview conducted at a date t

$$Wealth^{DB\ pension}(t) = \sum_i^n \frac{Y_i \times A_{\max\{R_i, a(t)\}}(t) + L_i}{(1 + CPI_t + d)^{\max\{R_i - a(t), 0\}}}$$

The sum over n DB pensions held by an interviewee

The period over which to discount, from $age(t)$ age at the date of the interview to R_i the relevant retirement date for pension i

CPI_t: the annual change in the CPI up to an interview conducted at a date t

d: the real discount rate used to convert a future payment into a present value

ONS apply the above model to interviews with households in their sample in each wave/round.

The above formulation of the model covers the approach taken for deferred DB pension entitlements, where the Y_i pension payable may be known. Where interviewees remain active participants in their DB pension scheme, this accrued value is calculated as:

$$accrual\ rate \times service \times pensionable\ salary;$$

there may be some scheme specific constraints that limit the pensionable salary definition or the maximum eligible service that are ignored.

For interviewees currently in receipt of their pension, the period of discounting applied on the bottom of the equation is nil. Therefore, the wealth is derived solely from the in-payment pension Y_i and the annuity terms available from the market.

Annex B: Assessment of discount rate approaches

	Green book STP[2]	SCAPE	SMPI	Gilts[3]	Corporate bonds[3]
	3.5% a year (real) Social Rate of Time Preference	1.7% a year (real) Superannuation Contributions Adjusted for Past Experience	Statutory Money Purchase Illustration	Index-linked gilt yield[4]	AA corporate bonds[4]
Stability	✓ Consistent at 3.5% real since 2003 ✓ Relatively stable, preserving valuation over time	✓ Relatively stable over time ✓ Stable between reviews, preserving valuation over time	✓ Pre-retirement returns relatively stable ✗ Partly volatile valuation due to annuity pricing	✗ Volatile and subject to market forces between and within rounds of the WAS ✗ Valuation of DB promise volatile	✗ Volatile and subject to market forces between and within rounds of the WAS ✗ Valuation of DB promise volatile
Consistency	✗ No relation to DC valuation (or other wealth)	✗ No relation to DC valuation (or other wealth)	✓ Consistent with the reporting used in DC schemes ✓ Market related a consistent with market values of other wealth (post-retirement only)	✓ Broadly what a market player would charge to replicate pensions promise (consistent with valuation of DC and other wealth) ✓ Annuity prices move in line with bond yields	✗ No relation to DC valuation (or other wealth) ✓ Annuity prices move broadly in line with bond yields (consistent with valuation of DC and other wealth)
Practicality	✗ External support required to calculate annuities	✗ External support required to calculate annuities	✗ Requires different rates pre- and post-retirement ✗ External support required to calculate annuities ✗ Require additional assumptions to be made about "volatility groups"	✓ The existing approach post-retirement ✓ Readily sourced market yield for pre-retirement discounting	✗ External support required to calculate annuities (which change from day-to-day)
Durability	✓ Has been reviewed once in 20 years, limited change took place at that review	✓ Reviewed every c. 4 years	✗ Presiding guidance (set by FRC) periodically reviewed and subject to change ✗ Duration of the index may vary and may not remain appropriate over time	✓ Active market providing reliable, well-defined yields ✗ RPI reform (from 2030) creates an anomaly within yield curves ✗ Duration of the index may vary and may not remain appropriate over time	✓ Active market providing reliable, well-defined nominal yield ✗ Duration of the index may vary and may not remain appropriate over time
Continuity	✗ Limited continuity of rationale/approach ✗ Likely to result in a significant reduction in the valued wealth	✓ A refinement of the current WAS approach ✓ Likely to result in a small (the smallest) change in the assessed wealth in past rounds	✗ Limited continuity of rationale/approach	✓ Broadly consistent with the approach informing the "market annuities" ✗ Likely result in significant increase in assessed value of past rounds	✓ Consistent with the approach taken in round prior to 2013 ✗ Limited continuity of rationale/approach

[2] There are other fixed discount rate approaches; e.g. the Organisation for Economic Co-operation and Development ('OECD') use 2% per year in their international comparisons.

[3] A typical approach in Private Sector DB funding would likely sit between the Gilt and the Corporate bonds discount rate approaches.

[4] The index-linked gilt yield and AA corporate bond approaches considered above assume that the current interview and calculation processes are retained, i.e. yields are referenced from the month of interview; alternative approaches may be considered by the ONS for implementation.

Annex C: Discounting and pensions increases

What is a discount rate?

DB pensions are a promise of a future income stream in retirement. Many elements around the size and timing of this promise are uncertain. It can be helpful to convert this promise of a future income stream into an equivalent value today.

A discount rate provides a tool to assess the time value of money, answering the question: "how much more(/less) valuable is £1 today than at some point in the future?".

Where a DB pension promise is backed by investments, this conversion can be thought of as equivalent to: "what returns will we receive on our investments?".

UK private sector DB regulation requires the advance funding of DB promises and the discount rate used to value DB promises is of crucial importance to the assessed (and perceived) cost of making a DB promise. An expectation of higher returns on investments results in more modest contributions in the immediate years ahead, conversely more prudent return expectations results in higher contributions in the immediate years ahead.

Most public sector schemes do not set aside advanced funding for their DB promises. Instead, pensions are paid out of general government income (i.e. taxation). To assess their equivalent value today, government use the expected long-term economic growth (reflecting their ability to raise monies either through taxation or borrowing).

For instance, Gross Domestic Product ('GDP') forecasts are used to set the discount rate. Government's current "Superannuation Contributions Adjusted for Past Experience" or ('SCAPE') discount rate is set at 1.7% above CPI inflation[5].

---

[5] The primary purpose of the SCAPE discount rate is for public sector employers to assess the cost of providing pension benefits. However, aligning the model to the cost to employers of providing pensions is not one of ONS's objectives for the model.

Typical discount rate structures

"Gilts +"
- With reference to a risk free rate, adjusting to reflect additional return anticipated for riskier investments (eg investing in equities)
- Commonly used by insurers (where it might also include "Gilts –") and the majority of private sector schemes

"CPI +"
- With reference to future inflation expectations adjusted for return expectations for riskier (or less risky) investments (eg investing in equities)
- Used in public sector funding valuations and by a small number of private sector schemes

"AA corporate bonds"
- With reference to a moderate risk yield
- Commonly used for DB pensions accounting disclosures in the UK (and for funding in other jurisdictions, eg the USA).

Nominal and real discount rates

Discount rates are commonly presented in two different ways:

- Either a "nominal" rate, which is the absolute return expectation;

- Or a "real" rate, which is the return expectation after allowing for the effects of some form of inflation (earnings, prices, CPI, CPIH, RPI etc)

These presentations are connected. For example: a nominal discount rate of 5% a year, with inflation over the same period expected to be 3% a year, can be expressed as a real discount rate of 2% a year.

In other words, a nominal discount rate can be formulated as:

"nominal" = "real" + expected inflation.

Where a pensions promise is inflation linked the process of valuing it in today's terms involves increasing the promise with inflation each year and then discounting it using a nominal discount rate. This process can be simplified by using a real discount rate instead. Effectively the inflation terms on the top and the bottom of the equation cancel.

When discount rates are applied, care is needed to consider whether a nominal or real discount rate is appropriate. When a real discount rate is used the measure of inflation allowed for within the "real" rate (either implicitly with the index-linked gilts or explicitly as with SCAPE) is important.

Evolution of SCAPE and gilts

The following chart illustrates the change in the (real) yield of the FTSE Actuaries Index-Linked gilt yield (average of 0% and 5% inflation) and the (real) SCAPE rate since 2011.

Chart 3: real SCAPE rate and real gilt yield over time
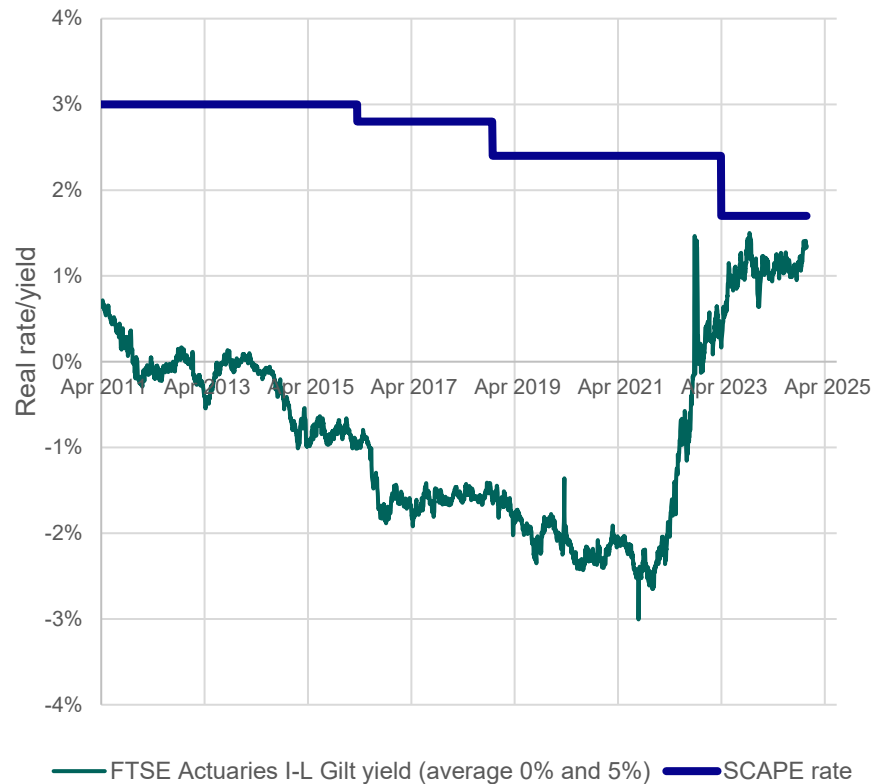
DB pensions increases

Typically pension promises provide some form of protection against inflation both before and after retirement.

For traditional final salary schemes, the link to salaries for active members, which may be expected to broadly increase over time, provides inflation protection.

Both public and private sector schemes provide an inflation link to pensions before retirement for early leavers of the scheme. In the private sector this is governed by statutory minimums of CPI (largely subject to a compounded cap of 5% a year); the public sector currently provide CPI increases both before and after retirement.

The private sector increases in retirement vary significantly according to the scheme design. Statutory minimum increases for indexation have varied depending on when each benefit was accrued. Before 1997 there was no requirement to provide increases, thereafter, there has been a requirement for a RPI/CPI increase (subject to an annual cap). It is not uncommon that scheme benefits were more generous than these minimum and provided RPI or CPI increases, often with an annual cap.

Annex D: Data, methodology and assumptions

Data, methodology and assumptions

Charts 1 and 2 are based on data published on 7 January 2022 by the ONS supporting the Household total wealth in Great Britain statistical bulletin: Pension wealth: wealth in Great Britain.

GAD have estimated wealth in Great Britain on alternative modelling approaches to inform the ONS's decision making. These estimates are based on aggregate data and assumptions have been made. These figures will differ from more detailed calculations.

GAD have disaggregated the DB element of the total pensions wealth from the data provided in Table 6.11. Pensions in payment are not distinguished between the respective accrual methods. Charts 1 and 2 assume all in payment pension (Round 7: £2.8tn) has been valued using the DB model.

The pensions wealth across each age group has been implied by mapping the median pensions wealth (all persons), Table 6.10) onto the DB pensions wealth disaggregated figure.

GAD have adjusted the wealth in each age group by calculating the impact of changing from the current to the alternative discount rate for each age group.

When considering a move to the SCAPE discount rate our total wealth illustrations use the current SCAPE discount rate of 2.4% per annum above CPI in Round 7 (as per our recommendation for Round 8).

When considering a move to Index-linked gilt yields our total wealth illustrations use a discount rate based on the FTSE Actuaries Index-Linked Gilt yield, average of 0% and 5% assumed inflation, maturity "over 5 years". (We have used mid-period yields so: Wave 4 at 30 June 2013: -0.01% pa; Wave 5 at 30 June 2015: -0.75% pa; Round 6 at 31 March 2017: -1.71% pa; Round 7 at 31 March 2019: -1.85% pa).

For reference, the yield at the equivalent points for Round 8 and Round 9 would be -2.12% pa and +0.25% pa respectively.

Pensions are paid over the course of an individual's life. In illustrating the impact of adopting different discount rate approaches, GAD have made assumptions about the average life expectancy of the population assumed to have pensions wealth.

GAD have used the S3 Series of the Self-administered Pension Scheme tables, produced by the Continuous Mortality Investigation bureau and the ONS 2020-based interim population projections.

Illustrations of the life expectancy at sample ages in Round 7 are shown in the table below:

Table 1: future life-time expected (years) at sample ages

Current age	20	30	40	50	60	70	80
Male	68.4	57.8	47.2	36.9	26.9	17.5	9.6
Female	71.3	60.6	50.0	39.4	29.1	19.5	10.9

Limitations

The data, methodology and assumption used to determine the figures in Charts 1 and 2 involve some approximations. Therefore, no reliance should be placed on the precise figures shown in the illustrations in Charts 1 and 2.

Any further model changes beyond the recommendations in this paper may also impact on the figures in Charts 1 and 2.

If any past WAS figures are restated following ONS's current review such re-statements may differ from the figures in this report.