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Gwynedd Pension Fund

2022 Valuation: Actuarial Assumptions

January 2022

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For and on behalf of Hymans Robertson LLP

Contents

1   Executive summary

The formal valuation is the Fund's most important budgeting and risk management exercise. As part of the valuation, the Fund reviews its funding strategy and funding plans. A key element of the funding strategy is the underlying actuarial assumptions. These assumptions should seek to reflect the Fund's future expectations and level of risk appetite. Both of these may change over time as more information becomes available, the environment in which the Fund operates evolves and the balance between prudence and affordability shifts in light of external factors. Therefore, it is both necessary and good practice to review the actuarial assumptions adopted by the Fund as part of every triennial valuation. The tables below set out our recommendation for each key valuation assumption, along with supporting rationale. The next step is for the Fund to use this information to agree the assumptions that will be used for the 2022 valuation.

Note that at this stage we are just agreeing these assumptions in principle. Any of the assumptions could in theory be changed before the valuation is formally signed off (which has to happen by 31 March 2023 at the latest) to take into account:

- experience arising between now and the valuation date of 31 March 2022;

- any significant 'post valuation date' events that may arise during the valuation year;

- the outcome of the employer consultation process on the Funding Strategy Statement which will be known before the end of the valuation year.

Financial assumptions

Assumption	2019 assumption	Recommended 2022 assumption	Reason for recommendation
Future investment returns	Based on Hymans Robertson's economic scenario generator which is called the Economic Scenario Service (ESS)	As per 2019 but updated to latest market calibration. The Fund is targeting the annual future investment return which has a 75% likelihood of being achieved.	Facilitates risk-based approach to setting contribution rates so the Fund can understand risk inherent in funding plans. Asset class return expectations are broadly similar to 2019.
Discount rate	1.7% p.a. excess above risk-free rate Based on a prudence margin of 75%	Keep prudence margin at 75%, resulting in an increase in the excess above risk-free rate to 2.0% p.a.	No significant change in the funding environment to justify an increase or decrease in the level of prudence in the assumption. 75% remains an appropriate level (in our opinion) of prudence for the Gwynedd Pension Fund's funding position and risk appetite. Increasing assumption from 1.7% p.a. to 2.0% p.a. will reduce contribution rates by 1.5%-3.0% of pay. However, it would mean in 20 years' time the Fund would hold around 5-10% less in assets (all other things being equal).
Benefit increases	Based on Hymans Robertson's ESS model	As per 2019 but updated to latest market calibration	Facilitates risk-based approach to setting contribution rates so the Fund can understand risk inherent in funding plans Inflation expectations are slightly higher (c.0.2-0.3% p.a.) than 2019 due to current economic outlook
Salary increases	0.3% above CPI inflation	0.5% above CPI inflation	2022 proposed assumption in line with 2019 long-term salary increase expectations. However, at 2019, allowance was made for short-term expected pay restraint. Given recent increases in National Living Wage and reduced impact on pension liabilities from short-term pay expectations, recommend that no allowance is made for any short-term pay restraint.

Demographic assumptions

Assumption	2019 assumption	Recommended 2022 assumptions	Reason for recommendation
Baseline longevity	Based on Club Vita analysis and reflects individual member characteristics	As per 2019 but updated to reflect latest observed non-Covid related mortality experience	Ensures longevity assumptions are tailored to Fund's membership to reduce risk of actual experience being materially different from expectations.
Future improvements in longevity	CMI2018 model Smoothing applied to recent experience Long-term rate of improvement = 1.25% p.a.	CMI2021 model No weight placed on 2020/21 data Adjustment to model to better reflect Fund's membership profile Long-term rate of improvement = 1.5% p.a.	Latest version of CMI model is best practice Avoid long-term projections being unduly affected by short-term Covid-19 experience Take advantage of new CMI model flexibilities to better fit future improvement projections (evidence suggests long-term improvements vary between socio-economic groups) Recent non-Covid experience has resulted in lower starting point for future improvement projections. Increase in long-term rate ensures life expectancies remain similar to 2019 assumption.
Withdrawals	Update the national assumption following the Fund specific analysis. Our recommendation is to apply scaling of 80% for full-time males, 80% part-time females and 75% for part-time males. We propose that no scaling is required for full-time females.		
Ill health retirements	Recent experience suggests no change needed from 2019 valuation assumption.		
Promotional salary scale	Recent experience suggests that the Fund has had consistently higher salary increases than the default assumption. After discussions with the Fund, we have agreed that no change is needed from the default assumption.		
Death before retirement	Reduction in assumed incidences of death before retirement to reflect recent national experience.		
50:50 option take-up	0.5%	0.5%	Reflects ongoing sustained low take-up of this option by members.
Retirement age	Simplification to assume members retire at the earliest age at which no benefits will be reduced. Reduces liabilities by around 1%.		
Cash commutation	50% pre-2008, 75% post-2008	65% of maximum tax-free cash	Simplification of calculation and assumption reflects Fund's recent membership experience.
Proportion leaving a dependant	Ensure current assumption reflects Fund's membership experience based on Club Vita analysis.		

2   Introduction

Addressee and Purpose

This paper has been commissioned by and is addressed to Gwynedd Council in its capacity as Administering Authority to the Gwynedd Pension Fund ("the Fund"). It has been prepared in our capacities as Actuaries to the Fund.

The next actuarial valuation of the Fund takes place as at 31 March 2022. This paper has been prepared to facilitate discussions on actuarial assumptions for the 2022 valuation.

This paper has been prepared solely for the use of the Administering Authority to the Fund to assist in setting the actuarial assumptions for use in the 2022 formal valuation. In this paper we set out our analysis and other relevant considerations that will help the Fund with this important decision-making aspect of the 2022 valuation.

This document should not be released or otherwise disclosed to any third party without our prior consent, in which case it should be released in its entirety. Hymans Robertson LLP accepts no liability to any other party, or for any other use, unless we have expressly accepted such liability in writing.

Given that this paper is to facilitate discussions about the assumptions, the final choice of assumptions may change from those set out in this paper. The final assumptions, and rationale if different from these proposals, will be documented elsewhere as part of the overall valuation process.

Format of paper

This paper is split into three sections:

1   Executive summary – to provide a high-level overview of the 2022 valuation recommendations and reasoning.

2   Main body – to provide more detail around the recommendations and their rationale. The main body contains discussions of the factors that have been considered in the assumption setting process and the derivation/methodology adopted.

3   Appendices – these contain more detailed technical explanations and material for those who wish to better understand certain aspects of the assumption setting process.

Next steps

After reading this report, we would be happy to discuss the contents with the Fund's Officers and/or Pensions Committee with the aim of helping them agree the assumptions to use for the 2022 valuation.

Once the assumptions have been agreed, these will be formalised in an updated version of the Funding Strategy Statement as part of the 2022 valuation process. However, we would recommend that an internal audit trail is also kept to document the rationale behind the selection of each assumption.

3   Background

Summary of the actuarial valuation

The formal valuation is the Fund's most important budgeting and risk management exercise. The purpose of the valuation is to:

- review the current funding strategy in light of changes to the economic, regulatory and social environment;

- set a contribution rate for every employer that will be paid (in this case) from 1 April 2023 to 31 March 2026, at which point rates will be re-assessed at the 2025 valuation; and

- check the current funding position.

To determine the required level of future employer contributions we must carry out two projections:

4   Benefit projection: this projects the benefits that will be paid to members in each future year (taking into account benefits accrued up to the valuation date and those that will continue to be accrued after the valuation date).

5   Asset projection: this projects the amount of assets in each future year, taking into account future employer and employee contributions, future benefit payments (from the benefit projection) and the investment returns that will be earned on the assets.

The contribution rates are then set such that, at the end of an agreed period (the **funding time horizon**), there are enough assets (from the asset projection) to meet the future benefit payments (from the benefit projections) in a sufficiently high number of possible future economic outcomes. This is the **funding objective**.

What actuarial assumptions are needed?

To carry out the valuation we need to make assumptions about the magnitude and timing of both the future benefits that will be paid out of the Fund and the future investment returns generated by the Fund's assets.

A summary of the actuarial assumptions required for the valuation exercise is set out on the next page in Table 1. The assumptions fall into two broad categories – financial assumptions and demographic assumptions.

Climate risk

Climate change will affect many aspects of the Fund's assets and liabilities, for example the return on its assets, the inflation used to revalue benefits and the longevity of its members. The uncertainty around future climate pathways and their impact means that it is impossible to factor climate change considerations into every assumption described in this paper.

We will however consider climate change scenarios when setting the long-term longevity improvements assumption (see section 5 and Appendix 3), and the Fund will consider climate risk in its funding strategy by testing its resilience under three climate scenarios.

A note on prudence

The valuation assumptions, when taken as a whole, are required to be prudent under LGPS guidance. To achieve this, we recommend that the discount rate be set with an explicit allowance for prudence and all other assumptions be set based on realistic ("best estimate") expectations.

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Table 1

Financial assumptions		
Assumption	**Description**	**Required for**
Future investment returns (split by asset class)	Projected annual returns and volatility on asset classes invested by the Fund e.g. UK equities, property etc.	**Asset projection** – to project the employer's asset share to the end of the funding time horizon
Discount rate	Annual rate of future investment return that will be earned on the Fund's assets after the end of the funding time horizon	**Funding objective** – to place a present value at the end of the funding time horizon of the future benefit payments
Salary increases	Future inflationary salary awards	**Benefit projection** – to determine the size of future benefit payments (the pre-2014 final salary and post-2014 Career Average Revalued Earnings benefits are linked to salary) **Asset projection** – to determine future payroll values (and hence contribution income)
Benefit increases	Future Consumer Price Index inflation	**Benefit projection** - to determine the size of future benefit payments (LGPS benefits are index-linked to CPI inflation)
Demographic assumptions		
Assumption	**Description**	**Required for**
Baseline longevity	How long we expect members to live based on current observed death rates	**Benefit projection** – to determine how long each member's benefits are paid for
Future improvements in longevity	How death rates are expected to change in the future (historically life expectancy has improved over time)	**Benefit projection** – to determine how long each member's benefits are paid for
Other demographic assumptions	• Retirement ages • Rates of ill health retirement, withdrawal from active service, death before retirement • Promotional salary increases scale • Rate and extent of commutation • Family details (proportion who die with dependants and age of dependants) • 50:50 option take-up	**Benefit projection** – to determine the size and timing of future benefit payments

4   Financial assumptions

Approach to setting financial assumptions

We use a "risk-based" approach to calculating the benefit and asset projections and setting the underlying financial assumptions. Under this approach, we use an economic scenario generator (Hymans Robertson's proprietary generator is called the Economic Scenario Service – ESS) to produce 5,000 different simulations of future financial assumptions. This allows us to generate a distribution of future benefit and asset projections so all stakeholders in the Fund can better understand risk. The assumptions in each scenario vary by year i.e. they are not 'flat', so they are a better representation of reality than a single, linear assumption. The chart below shows a sample of the 5,000 simulations for future cumulative total returns on global equities over the next 20 years.

Chart 1

Total Global Equity return from valuation date
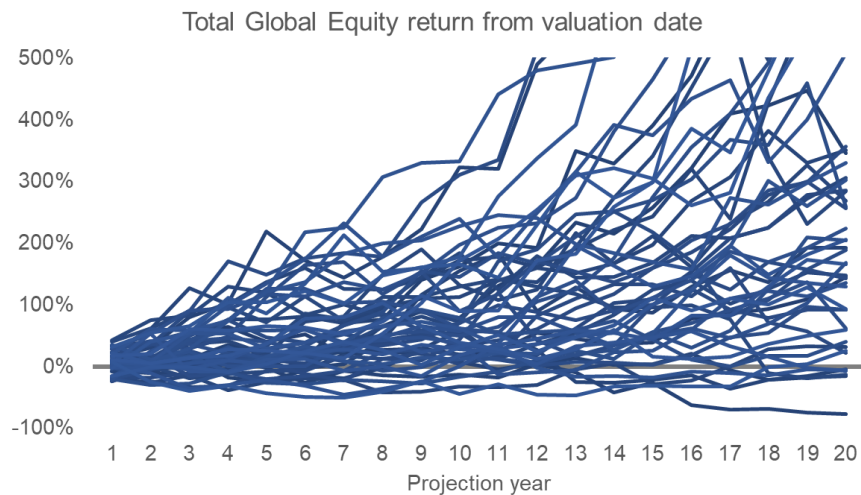
Future investment returns

The assumed future investment returns on each asset class, which feed into the asset projection and discount rate assumption, are generated from the ESS. Further detail on the ESS methodology and assumptions are provided in Appendix 1.

Discount rate

The discount rate is an assumption about the future expected investment return from the Fund's assets. The purpose of a discount rate is to place a present value on payments that are expected to be made in the future. This is achieved by 'discounting' the future payments. For example:

- The Fund needs to make a £100 payment in 5 years' time.

- The Fund's assets are expected to achieve a return of 4% p.a..

- To make this payment, the Fund will need to hold c.£82 today i.e. today's value of the payment is £82.

Under the risk-based valuation approach, the employer's assets and benefit payments are projected 5,000 times up to the funding time horizon. At this point, a discount rate is needed to place a value on the benefit payments due after the funding time horizon. Given that each of the 5,000 projections represents a different prevailing economic environment, a single, fixed value for the discount rate will not be appropriate for every simulation. For example, a high discount rate would not be appropriate in simulations with a weak outlook (at the funding time horizon) for economic growth and vice versa. Therefore, we use a discount rate that is reflective of the economic environment at the funding time horizon in that simulation. To do this we base the discount rate around the prevailing risk-free rate of return with allowance for higher expected returns from the Fund's non-risk free assets.

As mentioned in Section 3, we recommend that the discount rate is where the Fund builds in its margin of prudence in the assumption set. At the 2019

valuation, the discount rate used to set contribution rates (an assumed excess of 1.7% p.a. above the prevailing risk-free rate of return) had a 75% likelihood of being achieved by the Fund's assets. Based on the Fund's current long-term strategic asset allocation (set out in Appendix 2), and the 30 November 2021 calibration of the ESS, we estimate that there is now a 78% likelihood associated with this discount rate i.e. the prudence margin has increased.

If the Fund wishes to increase the prudence margin at the 2022 valuation to 78%, then no change will be required to the discount rate assumption. However, if the Fund wishes to maintain the prudence margin used at the 2019 valuation (i.e. a 75% likelihood), then the discount rate would assume an excess of 2.0% p.a. above the prevailing risk-free rate of return. We have also considered the impact on the assumption if the Fund decreased the prudence margin to 70%.

The above results are summarised in the table below. We would be happy to further explore using alternative prudence margins if necessary.

Table 2

Discount rate for contribution-setting	Discount rate assumption (above risk-free rate)	Prudence margin
Keep discount rate as per 2019 and update prudence	1.7%	78%
Keep prudence as per 2019 and update assumption	2.0%	75%
Reduce prudence margin	2.4%	70%

Each 0.1% p.a. increase in the discount rate assumption reduces employer contributions by approximately 0.5-1.0% of pay for an open, long-term employer

(ignoring other changes in assumptions and stabilisation mechanism overlays). It also results in the Fund holding less assets in the long-term (we estimate c.2-3% reduction for each 0.1% p.a. increase in the assumption).

The prudence margin at the 2019 valuation was agreed based on the Fund's risk appetite at the time, the current funding environment and uncertainty around the LGPS benefit structure (due to McCloud and the Cost Cap). Since 2019, the uncertainty around the benefit structure has been addressed. However, other forms of uncertainty have appeared – volatility in investment markets due to the pandemic's economic impact and concern around the long-term cost of climate change. Given this, and that the general funding environment and risk appetite of the Fund are broadly similar to 2019 (as far as we are aware), it would suggest that a prudence margin of 75% is maintained.

Recommendation: We recommend the Fund adopt a discount rate assumption for contribution rate setting that is in line with the Fund's current prudence margin of 75% i.e. 2.0% p.a.. We are comfortable that this level of prudence is appropriate for the purposes of funding a LGPS fund in the long-term.

Please note that the above analysis is based on the calibration of the ESS at 30 November 2021. All the valuation calculations will be based on the calibration at March 2022. As such the above prudence levels and associated assumed excess returns may alter. Whilst we do not expect there to be material changes, we will communicate this once the information is available to ensure you are still happy with the assumptions.

Future benefit increases

LGPS benefits increase each year in line with the Consumer Prices Index ("CPI") measure of inflation, which is therefore a key financial assumption for the valuation. Given the uncertainty and volatility around expected future CPI

inflation, we again use the ESS to model this assumption in a risk-based approach (see Appendix 1 for further details of the ESS).

Recommendation: We recommend that the future benefit increases and CARE revaluation (CPI inflation) assumption is based on the updated calibration of the ESS model as at 31 March 2022.

Salary increases

The salary increase assumption comes in two parts to reflect the two elements of pay increases:

- Annual 'inflationary' salary awards, historically set in order for employees' pay to at least keep up with the cost of living; and

- Promotional salary awards or those awarded as part of a defined salary scale.

This part of the paper considers the first element of the salary growth assumption only. Assumptions about promotional salary awards are considered later in Section 5.

The inflationary increase assumption is always set with reference to inflation e.g. 1% above inflation (or CPI + 1%). At the 2019 valuation, the assumption for 'inflationary' increases was based on an underlying assumption of short-term pay restraint (2% p.a.) to 31 March 2021, followed by long-term increases in line with CPI inflation + 0.5%. After allowing for the expected run-off of the Fund's final salary (pre-2014) linked benefits, this gave an assumption of CPI + 0.3%.

When considering the assumption to use at the 2022 valuation, there are four areas to consider.

1 **Run-off of final salary liabilities:** it is expected that the run-off of final salary liabilities from 2022 onwards is to be much more gradual than at previous valuations. This is because those members with the largest amount of final salary linked benefits are likely to be the oldest in the Fund and will have retired between 2014 and 2022. Therefore, the impact of short-term pay levels when setting this long-term assumption is diminished.

2   The **McCloud remedy** means that many members' post 2014 benefits effectively still retain a link to final salary until they retire, again meaning that the impact of short-term pay awards is reduced.

3   **Impact of Covid-19 on budgets:** the ongoing pandemic has had a significant impact on both public and private sector employer finances, with many still trying to recover and in challenging financial circumstances. Typically, in these situations, employers are controlling costs, including payroll costs, and therefore we see lower salary increases being awarded. This may suggest a reduction in the long-term salary increase assumption.

4   **National living wage increases:** recent years have seen an above inflation rise in the National Living Wage (NLW) (£9.50/hr in 2022 vs. £8.21/hr in 2019) and an increasing number of employers adopting this as their minimum wage. Although the NLW is aimed at the lowest paid, these recent increases will put pressure on salary rates across the whole workforce as employers may feel the need to keep the increments between staff consistent to adequately reward those with more responsibility or experience. This may suggest an increase in the long-term salary increase assumption.

One other topical area regarding salary increases is the recent increase in UK inflation expectations as a result of multiple factors (supply chain issues, low interest rate environment, Government stimulus packages etc.). Higher inflation generally feeds through to higher increases in pay as workers expect their salary to at least match cost of living increases. However, the salary increase assumption for the valuation is set with reference to inflation. Given that this topic is unlikely to have a long-term bearing on the margin above inflation used for salary increases, we do not believe that this should be a factor to consider when setting the assumption.

Given the above discussions, we are not aware of any issues that would suggest a significant change to this assumption from that adopted at the 2019 valuation (after removing the previous allowance for short-term pay restraint) i.e. CPI + 0.5%.

Recommendation: We recommend a future salary increase assumption of CPI + 0.5% p.a., subject to the Fund's input.

Reporting the funding level

As well as setting contributions, a key output of the valuation is a measurement of past service liabilities at the valuation date itself to determine the funding level. To report a funding level, we need to use a single value for each assumption (compared to the risk-based approach used for contribution rate setting).

To ensure consistency between the reported funding level and employer contribution rates, we still use the ESS to derive the assumptions used to report the funding level. These assumptions are summary statistics of the 5,000 individual simulations used to project forward assets and benefit payments when setting contributions.
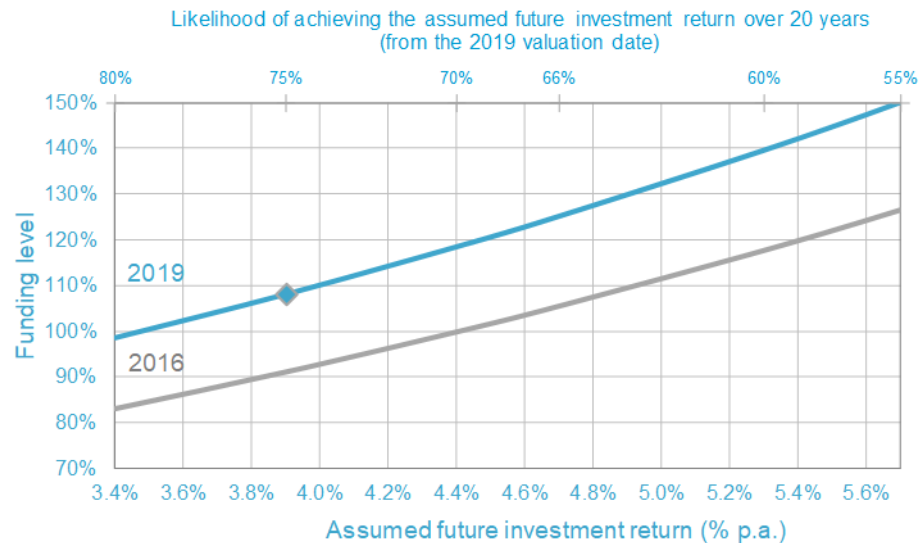
Future investment return

At the 2019 valuation, we showed:

- How the funding level at the valuation date varied with the choice of future investment return; and

- The likelihood of the Fund's assets yielding at least a given investment return (based on the ESS simulations).

This was all detailed in the one chart, an example of which is shown (this is the chart contained in the Fund's 2019 valuation report).

Chart 2

Likelihood of achieving the assumed future investment return over 20 years (from the 2019 valuation date)

At the 2019 valuation, the Fund used a summary investment return for funding level reporting purposes of 3.9% p.a., which had an associated 75% likelihood i.e. the same level of prudence as that used for contribution rate setting.

For the 2022 valuation, we will continue to report the funding level using the above 'tramline' chart to give you the best possible understanding of funding risk. However, we also need to report a single funding balance sheet based on a single future investment return.

At the 2022 valuation, we recommend that the future investment return selected continues to be the one which has the same likelihood as that used for contribution rate setting purposes i.e. 78% (or 75% if you decide to maintain the 2019 prudence margin for contribution rate setting). This will continue to provide consistency between contribution rates and funding positions.

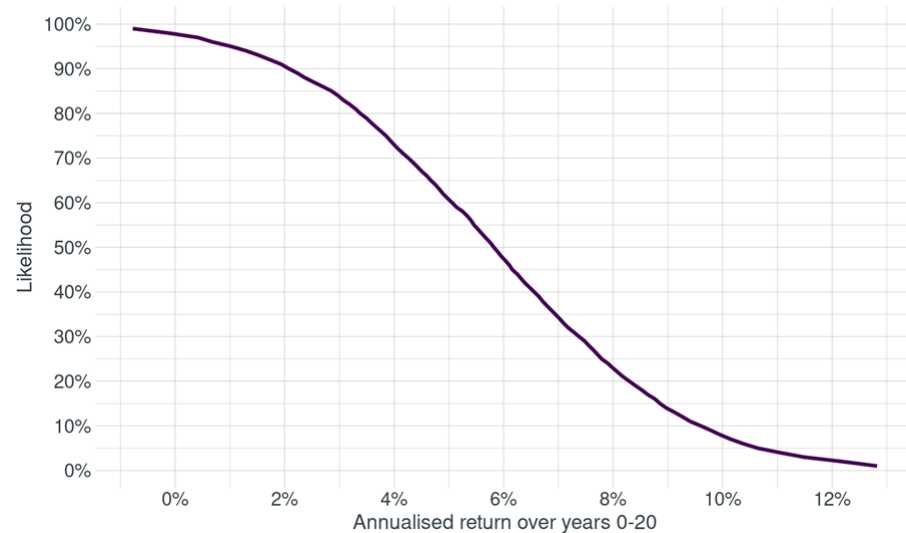Based on the 30 November 2021 calibration of the ESS, the results of our analysis are:

Table 3

Future investment return	Investment return (absolute)	Likelihood now
Same likelihood as for contribution-setting	3.6% p.a.	78%
Same likelihood as in 2019	3.9% p.a.	75%

As a rule of thumb, each 0.5% p.a. increase in the assumed future return would decrease the liabilities, and increase the funding level, by approximately 10%.

The chart below sets out more detail about the expected future return on the Fund's assets.

Chart 3

Salary increases

Given that the salary increase assumption for contribution rate setting is expressed in relation to CPI inflation, for funding level reporting purposes this assumption will be based on the CPI inflation assumption plus the agreed margin (which we recommend as 0.5% in Section 4).

Benefit increases

For funding level reporting purposes we will use a value for CPI inflation which has a 50% likelihood of occurring (i.e. best estimate) over the next 20 years. This assumption represents a best estimate expectation of future CPI inflation.

Based on the ESS calibration as at 30 November 2021, the CPI inflation assumption would be 2.6% p.a. (an increase from the 2019 valuation assumption of 2.3%, reflecting the current outlook for potentially higher inflation). However, please note that to report the funding position as at the valuation date, the 31 March 2022 calibration will be used.

This is a change in approach from that used at the 2019 valuation (set by reference to the difference in yields available on long-term fixed and index-linked gilts) due to the supply/demand distortion that currently exists in the gilt market.

5   Demographic assumptions

Longevity

Of all the demographic factors, longevity is the one that presents the greatest uncertainty to an LGPS fund. There are two components when setting an assumption for longevity:

1   How long people currently live for, based on observed life expectancies ('baseline longevity'); and

2   An allowance for possible future improvements to longevity ('future improvements').

Throughout most of the 2000s and 2010s, life expectancy in the LGPS had been steadily increasing. This was reflected in the longevity assumptions set by actuaries at successive valuations, which often led to an increase in the value of the past service liabilities and higher contribution rates payable by employers, as improvements outstripped expectations.

However, in recent years (and ignoring the Covid-19 pandemic), experience has bucked the trend with a noticeable slowdown in life expectancy improvements. This slowdown has not been consistent across the population, with those in lower socio-economic groups experiencing a greater slowdown than the more affluent members of society.

Covid-19 pandemic

The Covid-19 pandemic has unfortunately resulted in increased morbidity and death since 2020. It is likely that we will see higher than expected death experience since the 2019 valuation. This will result in a decrease in liabilities as the Fund will be paying out less pension than expected.

However, Club Vita's latest monitoring report for the Fund suggests that there was actually an increase in liabilities of 0.1% from less deaths than expected over the year to 31 March 2021.

This is probably not what most people would expect. However, the cause is due to Covid-19 tending to affect older members of the population and those with poorer health characteristics. As remaining life expectancy for these members was already expected to be relatively short, the timing between actual and expected death is proportionately smaller.

The bigger impact from Covid-19 on the Fund's liabilities and funding strategy will be any impact on future improvements to longevity, driven by the lingering after-effects of the pandemic.

Firstly, we know Covid-19 has affected different groups of society to differing degrees. Early evidence suggests more affluent socio-economic groups have been more resilient to the effects of the pandemic. Therefore, in the longer-term, we expect this group's life expectancy to be less impacted by Covid-19. That is why it will be even more important to reflect your own membership to capture the socio-economic differences in your longevity assumption.

Secondly, we need to consider the impact of Covid-19 on the long-term trajectory of life expectancy. This is an emerging issue with lots of ongoing research. However, our longevity experts have the earliest access to a large mass of emerging data and statistics and hence are able to simplify this research to help funds consider how they want to reflect their view (informed by our support and advice) in the longevity assumption.

Baseline longevity

The Fund participates in Club Vita to monitor and manage its longevity risk. Participation also provides the Fund the ability to set a baseline longevity assumption using a bespoke set of VitaCurves that are specifically tailored to fit each individual member of the Fund. This tailored fit approach is important as life expectancy can vary significantly between members depending on certain characteristics. Further details are set out in Appendix 3.

For the 2022 valuation, **we recommend using the latest available set of individual member VitaCurves**. This method is the same approach that was adopted at the 2019 valuation and is more accurate than trying to fit standard mortality tables to reflect the Fund's membership.

For the avoidance of doubt, the baseline longevity assumption at the 2022 valuation will be reviewed and, if necessary, adjusted to ensure it is not materially distorted by the mortality experience observed in 2020 and 2021 due to Covid-19.

Future longevity improvements

As mentioned above, even before the Covid-19 pandemic, recent evidence suggested that we may be starting to see a slowdown in the rate of future life expectancy improvements. This is set out in the chart below.

Chart 4

Period life expectancy from age 65
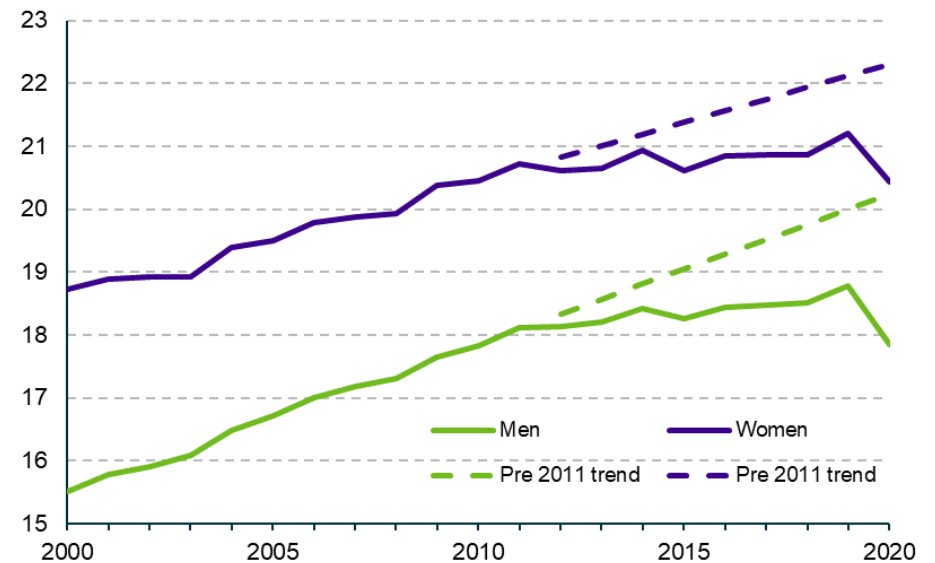
Source: Curtate life expectancy at age 65, based on data for England & Wales, as published by the CMI in Working Paper 147 alongside the CMI 2020 model

The causes for this slowdown – and what might happen in the future – are hotly debated. This uncertainty means that more judgment is required to set the future improvement assumption at the 2022 valuation.

The starting point all actuaries use for setting the future improvement assumption is the Actuarial Profession's Continuous Mortality Investigation

(CMI) longevity improvement model. This model is updated annually with the latest observed mortality data. **Our recommendation for the 2022 valuation is to use the latest available version of the CMI longevity improvements model, likely to be CMI_2021**. We expect this model to be published in March/April 2022 and calibrated to England & Wales population mortality data up to 31 December 2021.

The core CMI model has a set of parameters that allow users to adjust the model to reflect the membership of the entity being modelled and their beliefs about future trends. There are three key parameters to consider for assumption setting at the 2022 valuation.

1. Weight placed on 2020 (and 2021) experience (the "W_{2020}" parameter)
For projecting forward future rates in longevity improvements, the CMI model uses recently observed improvement rates as a starting point. Given that both 2020 and 2021 have been significantly affected by the Covid-19 pandemic, **we would recommend that no weight is placed on data from these years**. This will avoid overstating the impact of the pandemic on long-term rates of improvements, as we have little evidence of the long-term effects at this stage.

2. Adjustment to observed data to reflect scheme membership (the "A" parameter)
As mentioned above, the CMI model is based on England & Wales population mortality data. Evidence suggests that most members of an occupational pension scheme (e.g. the LGPS) have experienced higher improvements in life expectancy than the general population in recent years. The A parameter allows users to adjust the starting point for the projections in the model to reflect this differing experience.

To help set this parameter, Club Vita have undertaken some analysis to calculate mortality improvement rates split by socio-economic group. The results are detailed in Appendix 3. Based on the analysis, **we recommend**

using the A parameter to adjust the starting point in the CMI model by 0.5%.

3. Long-term rate of improvement

The final parameter to set is the expected level of longevity improvements which will be sustained in the long-term. When thinking about this parameter, there are typically two key areas to consider:

- How has life expectancy been increasing over the longer term, and how could this be projected to increase in future?

- What are the drivers which might lead to future improvements being lower or higher than the historical rate?

Appendix 3 contains a detailed discussion of historic longevity improvements and what factors (pandemic and non-pandemic) might affect how life expectancy changes in the future.

In our opinion, we do not believe we have sufficient evidence to justify an explicit adjustment to the future improvement assumption in light of any of the key drivers discussed in Appendix 3. Furthermore, at this stage, we are of the opinion that it is too early to understand what the long-term impact of Covid-19 could be on life expectancy. However, if the Fund does have firmer beliefs or views in this area, we would be happy to discuss and reflect that in the 2022 valuation future improvement assumption.

At the 2019 valuation, we used a long-term improvement rate of 1.25% p.a.. Given that we do not believe there have been any significant events to suggest a material change in absolute life expectancy, and that we are now starting the future improvement projections from a lower starting point than in 2019 (due to the recent heavier mortality experience), **we recommend that the long-term rate adopted at the 2022 valuation is 1.5% p.a.**. This should ensure that life expectancy is similar in absolute terms to that at the 2019 valuation.

Pre-retirement demographics

Assumptions such as the rate at which members are assumed to leave local government employment with a deferred pension and the assumed incidence of ill-health early retirements affect the assessed cost of benefits accrued to date and the cost of benefits accrued in future. However, in terms of magnitude, these assumptions are second-order compared to those already discussed in this paper.

The starting point for our proposed 2022 valuation assumptions was to analyse past experience over 2016 to 2019 for all the LGPS funds Hymans Robertson advises (39 funds in England & Wales). This analysis provides an overall recommended assumption for LGPS funds ("the default") for the valuation. While this gives an average set of assumptions which we feel are suitable across the whole LGPS, we understand that there may well be local factors which influence certain assumptions, or some funds with markedly different experience. Best practice dictates that each fund selects an assumption set which reflect the underlying membership and the fund's own views of the future. Therefore we have carried out this analysis to enable the Fund to meet best practice.

This report looks at the actual experience (i.e. number of actual events recorded in the Fund's membership data between 2016 and 2019) and compares this to the expected values based on the 2022 national default assumption. The underlying analysis and data used for this analysis is set out in Appendix 4. The outcome and recommendation of the analysis is contained within the main body of the report.

Withdrawals (excluding ill health)

Based on our analysis of withdrawal experience from 2016 to 2019 at a national level we have made increases to the likelihood of withdrawals at each age so that our default assumption better reflects recent experience (the magnitude of increase differs between gender and part-time/full-time workers but the range is

between 15% to 40%). This continues the trend we observed at the 2019 valuation (the analysis covered the period 2013 to 2016) and reflects increased job mobility within today's workforce (e.g. the end of a job-for-life outlook to employment).

At a Fund level, the analysis showed that withdrawals have been lower than our proposed assumption. Therefore changes are required to the default assumption to reflect local experience.

We propose updating the national assumption following the Fund specific analysis. Our recommendation is to apply scaling of 80% for full-time males, 80% part-time females and 75% for part-time males. We propose that no scaling is required for full-time females.

Ill health early retirements

The national analysis we carried out for the 2022 valuation suggests that the incidence of ill-health retirements is slightly lower than expected at 2019. However, we are proposing to leave our default assumption at its current level in light of the potential increase in ill-health retirements as a result of Covid-19, both direct (those suffering severe long-term Covid-related illness) and indirect (reduced access to healthcare systems).

At a Fund level, the analysis showed slightly lower than expected numbers of ill-health retirements. However, given the small number of cases in the Fund we do not believe there is credible evidence to justify a change from our default assumption.

Promotional salary scale

As mentioned earlier, our assumption for pay growth has historically been split into general inflationary pay increases and promotional pay growth. At the 2019 valuation we used the same promotional pay scale for all members i.e. there was no split between men/women, full-time/part-time employees and officers/manual workers. The national analysis carried out for the 2022

valuation does not suggest that any change is required from the salary scale used for the 2019 valuation.

However, the analysis of the Fund's own membership shows that salary increases have been consistently above the default assumption at all ages. After discussions with the Fund, we have agreed that no change is needed from the default assumption.

Death before retirement

The overall incidence of death-in-service is very low. Furthermore, our analysis at national level for the period 2016 to 2019 suggests that the incidence of death-in-service is slightly lower than expected at 2019. Whilst there may be a slight increase as a result of Covid-19 for the period 2019 to 2022, we believe this will only be temporary due to the efficacy of vaccines in the working-age population. We would also expect the death-in-service rate to fall at each valuation for the same reason as we expect life expectancies to increase in general. Therefore we have reduced the default expected rate of death-in-service by 20% for the 2022 valuation.

At a Fund level, the analysis showed that the incidence of death-in-service has been slightly lower than expected at 2019 for males and females. However, given the small number of cases in the Fund we do not believe there is credible evidence to justify a change from our default assumption.

50:50 take-up option

From 1 April 2014, members have been able to elect to pay half the standard level of contributions for half the accrued benefit (i.e. an accrual rate of 1/98). This option affects future service only (past service is protected) and the employer's cost will fall as a result of members choosing this option. This benefit is known as the *50:50 option*.

At the 2019 valuation we assumed that 0.5% of members (uniformly distributed across the age, service and salary range) would choose to take up the 50:50

option. This was agreed based on the actual Fund take-up at 2019 of approximately 0.5%.

It is still not clear whether take-up will remain low or increase in future due to the impact of more awareness campaigns and higher annual and lifetime tax allowances. We would recommend that the assumption remains at 0.5%.

Retirement age

Due to benefit changes over the years there are a complex set of rules determining the age at which LGPS members can take their benefits without seeing them reduced. These rules differ by member (depending on age and when they joined the scheme) and tranche (with the pre-2008 and pre-2014 schemes having earlier retirement ages). However, by 2022 a lot of members with complex retirement ages will have reached these ages and can therefore be assumed to retire imminently, allowing us to simplify our assumptions.

At the 2019 valuation we assumed that members retired in the years up to their state pension age, with a chance of retiring in each year from 55 based on analysis of historical data. For 2022 we will assume that members retire at the earliest age at which none of their benefits will be reduced. For most members this is their state pension age (SPA). For members with an SPA over 65, we will allow for increases to their pre-2014 benefits according to LGPS late retirement factors.

Based on analysis of a few sample funds, we estimate that the impact of this change in assumption is a small reduction in liabilities of around 1%.

Cash commutation uptake

At the 2019 valuation, the rate at which members were assumed to exchange pension for tax-free cash at retirement (commutation) was 50% of HMRC limits for service to 1 April 2008 and 75% of HMRC limits for service from 1 April 2008. For the 2022 valuation, we have simplified our calculations and methodology such that this assumption no longer needs to be split between

service tranches. Based on analysis of the Fund's actual commutation experience between 2016 and 2019, we propose an assumption that members exchange pension for tax-free cash at 65% of HMRC limits.

Proportion leaving a dependant

This is an area that is monitored by Club Vita as part of helping the Fund manage their longevity risk. The chart below details the percentage of members who are outlived by a partner eligible for a LGPS dependant pension.

Chart 5

Proportion of pensioner deaths which gave rise to dependants for year ending on 31 August 2021
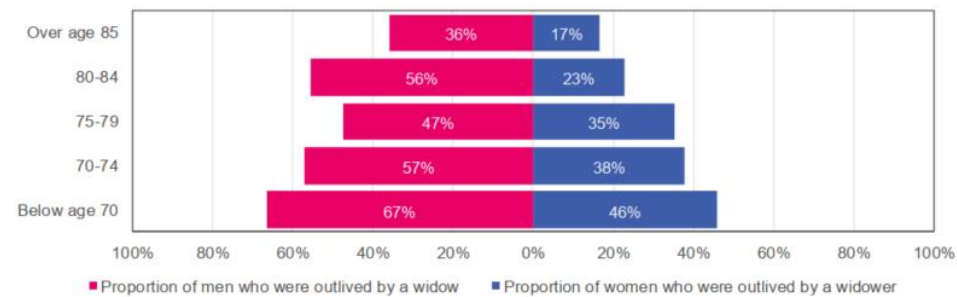
As expected, the percentages are higher for males as females live longer on average. For the 2022 valuation, we will review the 2019 assumption and assess whether an adjustment is required to better reflect your Fund's experience.

6   Reliances and limitations

This paper is addressed to Gwynedd Council as Administering Authority to the Gwynedd Pension Fund. It has been prepared in our capacity as Actuaries to the Fund and is solely for the purpose of discussing the assumptions for the 2022 formal valuation and sets out our recommendations. It has not been prepared for any other purpose and should not be used for any other purpose.

The Administering Authority is the only user of this advice. Neither we nor Hymans Robertson LLP accept any liability to any party other than the Administering Authority unless we have expressly accepted such liability in writing. The advice or any part of it must not be disclosed or released in any medium to any other third party without our prior written consent. In circumstances where disclosure is permitted, the advice may only be released or otherwise disclosed in its entirety fully disclosing the basis upon which it has been produced (including any and all limitations, caveats or qualifications).

The results of the Fund specific pre-retirement demographic analysis are wholly dependent on the valuation data provided to us for the 2019 valuation and the assumptions that we use in our calculations.

The assumptions in this document are for the Fund as a whole. For the avoidance of doubt, we propose to apply the same assumptions across all employers in the Fund.

The following Technical Actuarial Standards are applicable in relation to this advice, and have been complied with where material and to a proportionate degree:

- TAS100; and

- TAS300.

Richard Warden FFA

6 January 2022

For and on behalf of Hymans Robertson LLP

Appendix 1 – ESS methodology and assumptions

ESS methodology

The ESS uses statistical models to generate a future distribution of year-on-year returns for each asset class e.g. UK equities. This approach is also used to generate future levels of inflation (both realised and expected). The ESS is also designed to reflect the correlations between different asset classes and wider economic variables (e.g. inflation).

In the short-term (first few years), the models in the ESS are fitted with current financial market expectations. Over the longer-term, the models are built around our long-term views of fundamental economic parameters e.g. equity risk premium, credit-spreads, long-term inflation etc. The ESS is calibrated every month with updated current market expectations (a minor calibration). Every so often (annually at most), the ESS is updated to reflect any changes in the fundamental economic parameters as a result of change in macro-level long-term expectations (a major calibration).

Summary of ESS calibration

The table below summarises the calibration of the ESS as at 30 November 2021. Please note that for the 2022 valuation we will use the 31 March 2022 calibration of the ESS; this will be communicated and shared in the advice presented to you during the valuation year. All returns are shown net of fees and are the annualised total returns over 5, 10, 20 and 40 years.

The highlighted figures in the table below show that, for example, over the first 20 years of the model:

- In 800 of the 5,000 simulations (84th percentile), overseas equity returns are projected to be greater than 10.1% per annum.

- In 2,500 of the 5,000 simulations (50th percentile), overseas equity returns are projected to be greater than 5.7% per annum (this can be viewed as the best estimate return for overseas equities over the next 20 years).

- In 4,200 of the 5,000 simulations (16th percentile), overseas equity returns are projected to be greater than 1.2% per annum (implying that in 800 simulations, overseas equity returns are projected to be less than 1.2% per annum).

It is important to remember that the above figures are summary in nature and do not reflect the year-to-year volatility in returns in each simulation i.e. each individual simulation is not a 'flat' consistent annual return.

The impact of using the March 2022 calibration compared to the 2019 calibration varies by asset class, and the overall impact will also depend on whether the investment strategy has changed. The expected returns on most asset classes are similar. One notable exception is index-linked gilts, where reform to the Retail Price Index inflation measure means that expected returns are materially lower now.

		UK Equity	Overseas Equity	Private Equity	Property	Infrastructure Equity	Global Equity	Multi Asset Credit (sub inv grade)	Absolute Return Bonds (inv grade)	Inflation (CPI)
					Annualised total returns					
5 year	16th %'ile	-3.7%	-3.4%	-7.0%	-3.3%	-4.8%	-3.2%	0.7%	1.2%	2.0%
	50th %'ile	4.5%	4.5%	5.3%	2.7%	4.3%	4.7%	3.4%	2.2%	3.6%
	84th %'ile	12.5%	12.4%	19.1%	9.0%	14.3%	12.3%	5.4%	3.1%	5.2%
10 years	16th %'ile	-0.9%	-1.0%	-3.2%	-1.3%	-1.8%	-0.8%	1.6%	1.3%	1.5%
	50th %'ile	4.7%	4.9%	5.7%	3.1%	4.8%	4.9%	3.5%	2.4%	3.1%
	84th %'ile	10.6%	10.7%	15.6%	8.0%	12.0%	10.5%	5.2%	3.6%	4.8%
20 years	16th %'ile	1.2%	1.2%	0.3%	0.6%	0.8%	1.4%	2.8%	2.1%	1.1%
	50th %'ile	5.6%	5.7%	6.6%	4.1%	5.7%	5.7%	4.4%	3.5%	2.6%
	84th %'ile	10.2%	10.1%	13.4%	7.9%	10.9%	10.1%	6.0%	5.0%	4.2%
40 years	16th %'ile	3.0%	2.9%	2.5%	2.0%	2.6%	3.1%	3.9%	2.9%	0.9%
	50th %'ile	6.4%	6.4%	7.4%	4.9%	6.6%	6.5%	5.6%	4.6%	2.2%
	84th %'ile	9.9%	10.0%	12.6%	8.0%	10.6%	10.1%	7.6%	6.6%	3.5%
Volatility (Disp) (1 yr)		18%	17%	28%	14%	21%	17%	5%	3%	3%

Appendix 2 – Fund's Asset Allocation

The table below sets out the long-term strategic asset allocation we have used for the analysis of the future expected investment returns for the Fund and the subsequent discount rate recommendations. This asset allocation is dated as at 30 September 2021 and was provided by our Investment colleagues.

Asset class	Allocation
UK equities	10.5%
Overseas equities	49.5%
Private equity	5.0%
Total growth assets	65.0%
Property	10.0%
Infrastructure	2.5%
Multi Asset Credit	7.5%
Total income assets	20.0%
Absolute return bonds	15.0%
Total protection assets	15.0%
Total	100%

The investment strategy may change during the course of the valuation as this is when the funding and investment strategies are typically reviewed. We would only expect the results in this paper to materially change if there was a significant change in the high-level asset allocation.

Appendix 3 – Additional detail on longevity assumptions

Baseline longevity

Club Vita's analysis shows that baseline longevity varies significantly between members based on a wide range of socio-economic factors. For example:

Characteristic	Impact on life expectancy from age 65
Gender (Female vs. Male)	Increase of 2-2½ years
Reason for retirement (Ill health vs. Normal)	Decrease of 2½ to 3½ years
Location based longevity group (High vs. Low)	Increase of 4½ to 5 years
Pay at retirement (<£17k p.a. vs. >£73k p.a.)	Increase of 2 to 3 years
Occupation (Non-manual vs. Manual)	Increase of less than ½ year

**Longevity improvements – Initial addition (A) parameter**

The CMI model is based on England & Wales population mortality data. Evidence suggests that most members of an occupational pension scheme (e.g. the LGPS) have experienced higher improvements in life expectancy than the general population in recent years. The "A" parameter allows users to adjust the starting point for the projections in the model to reflect this differing experience.

To help set this parameter, Club Vita have undertaken some analysis to calculate mortality improvement rates split by socio-economic group. The results are shown in the table below along with the England & Wales rates within the core CMI_2020 model.

This analysis is consistent with similar analysis performed by the CMI, which found higher longevity improvements in less deprived population groups (IMD deciles 8-10). These results are also shown in the table for comparison.

	Annualised mortality improvement (2013 – 2018)	
	Men	**Women**
England & Wales (core CMI)	0.9%	0.6%
Club Vita 'Comfortable'	+0.3% vs. E&W	+0.5% vs. E&W
Club Vita 'Making-Do'	+0.5% vs. E&W	Analysis showed no material difference by segment for women
Club Vita 'Hard-Pressed'	-0.2% vs. E&W	
CMI analysis IMD deciles 8-10 (more affluent)	+0.2% vs E&W	+0.3% vs E&W

Both analyses show that, in recent years, more affluent individuals have enjoyed higher than average improvements in life expectancy. It is these individuals that also tend to dominate the liabilities of the Fund. Indeed, the breakdown of the Fund's membership between the Comfortable (most affluent), Hard-Pressed (least affluent) and Making-Do (mid affluence) groups has been calculated by Club Vita and is shown below.
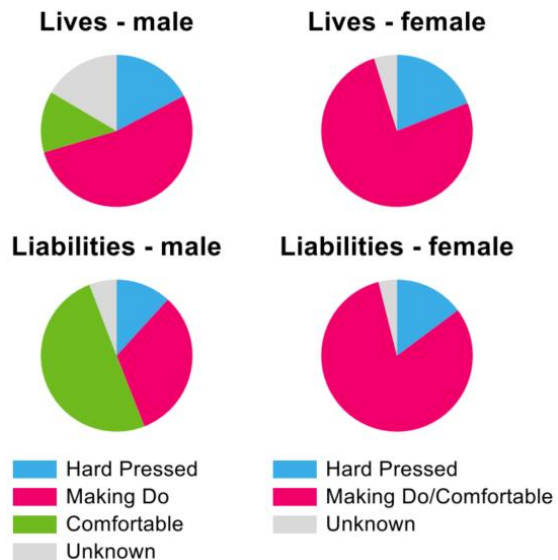
The majority of the Fund's liabilities relate to those members in the making-do and comfortable groups. As such, we would recommend using the "A" parameter to adjust the starting point in the CMI model by 0.5%.

Longevity improvement – long term rate of improvement
Historic life expectancy improvements

The chart below shows how life expectancy from age 65 has changed over the last 180 years. For women, we can see that there has been a fairly constant pattern of increasing longevity, at a rate approaching one year per decade, for much of the 20th Century. In contrast the pattern for men is more "stop-start", with periods of increase followed by periods of stagnation (e.g. the 1920s/1930s and the 1950s/1960s). For men and (to a lesser extent) women there is an acceleration of period life expectancy in the late 1990s/early 2000s. This is partly a consequence of the well-documented "golden cohort" effect associated with individuals born in the late 1920s and early 1930s who reached age 65 during the 1990s.
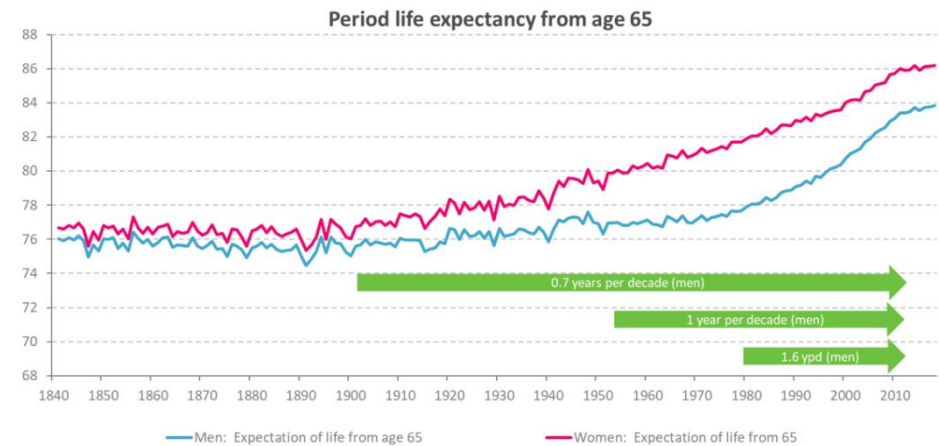
The general pattern of divergence and then convergence between male and female life expectancies is partly attributable to smoking patterns (both take-up and cessation).

When considering long term rates, the most recent decades are the most important as they reflect a period when people were routinely living to 65+ and so the focus of medical advances had been on the diseases of older age. Based on historical data, and in particular the more stable female trend observed during the 20th century, a long-term rate of improvement in life expectancy of the order of one year per decade might be reasonable, equivalent to a long-term rate of between 1.25% and 1.5% p.a..

Future drivers of change

The changes in life expectancy over the last 180 years have been driven by significant factors such as the discovery of penicillin, the introduction of the NHS and reduction in smoking. Looking forward we need to consider what factors will affect longevity in future, how likely they are to happen, and what their impact will be.

Why might long-term improvements be lower than historical trends?

1 Socio-economic transition: the make-up of the current retired population is likely to be very different to that 50 years ago, with a general 'gentrification' of the UK population as manual industries have declined. This will have contributed to the improving health and longevity of the UK population and may be unlikely to continue at the current rate of change.

2 Smoking effects: The historical decline in circulatory disease can, in part, be attributed to specific behavioural changes like smoking cessation, and 'you can only give up smoking once' so a major contributor to historical improvements will not be available to support future improvements.

3 Obesity: The rising epidemic of obesity amongst the younger population is often cited as a driver for slowdown of UK longevity.

4 Super-bugs: the risk that drug-resilient strains of various diseases will develop, leading to a reduction in our ability to protect against infectious diseases in later life e.g. MRSA.

5 Resource scarcity: were we to have issues with food transportation, international food production or continued population growth then we may see a reversal of the recent benefits of better diets and healthier lifestyles. You can read more about the potential impacts of climate change on longevity in Club Vita's Hot and Bothered research paper.

Why might long-term improvements be higher than historical trends?

The debate around future improvements often focuses on why the improvements should be lower than suggested by historical trends. However equally there are reasons why improvements may be considerably higher than suggested by historical trends.

1 Government intervention: a future example could be the government intervening more proactively to reduce alcohol consumption, akin to the campaigns against smoking.

2 Medical innovation: advances in nanotechnology and 'intelligent-drugs' are just two examples of recent innovations which could drive faster improvements than predicted by historical trends.

3 Anti-ageing: increased understanding of the ageing process may enable us to delay onset of senility and Alzheimer's, increasing life expectancy.

4 Regenerative medicine: the ability to replace, rejuvenate or regenerate human cells, tissues and organs to establish normal function could allow humans to address specific genetic disorders, 'grow' organs for transplant or alleviate the molecular damage caused by ageing.

5 Super-drugs: the discovery of 'super-drugs' – drugs which are able to tackle multiple causes of deaths, for example different cancers – could dramatically accelerate increases in life expectancy.

6 Serendipity: serendipity pervades medical advances and medical researchers continue to make serendipitous discoveries – such as the mounting evidence that regular taking of aspirin not only reduces blood pressure but also reduces the risk of cancer. A serendipitous discovery which led to increased cancer survival periods (or indeed reduced cancer incidence) would be one way in which serendipity could drive higher improvements over the long-term.

Impact of Covid-19 as a driver of change

When considering how the lingering after-effects of the global COVID-19 pandemic could affect the longevity of the pension fund members, it is useful to consider scenario analysis of how the pandemic could evolve over time. We have examined the analysis set out in Club Vita's research paper "Covid-19 longevity scenarios". These scenarios, together with consideration of other risks such as covenant and investment risk, can help pension funds quantify and communicate the potential ramifications of the coronavirus pandemic as part of their risk management framework.

The Covid-19 pandemic is likely to influence longevity in 2022 and beyond from a few key drivers:

- Direct risk of Covid-19 – what will be the efficacy of vaccines, take-up rates, improvements in Covid-19 treatments and social distancing measures?

- Disruption to non-Covid-19 medical care – how long will the disruption to healthcare systems last and what will its impact be on mortality rates in the short-to-medium term?

- Changes to health and care systems – improvements to health systems, with a greater focus on preventative measures, and innovation in healthcare and vaccine technology.

- Global recession – there could be a long economic downturn, following the ongoing bounce-back, resulting in strained healthcare finance and negative lifestyle changes.

Combining each driver above, four holistic scenarios are outlined below which have a range of optimistic and pessimistic outcomes for longevity (relative to pre-Covid-19 expectations).

- Bump in the road – COVID-19 has a short and isolated effect and after a marked increase in deaths due to the pandemic in 2020 and 2021, trends return to the pre-pandemic rate, although with a couple of "lost years" of longevity improvement that will never be recovered.

- Innovation in adversity – together with the swift recovery from the pandemic already seen, lessons learnt during the outbreak of Covid-19 act as a catalyst for longer term improvements in health and longevity, particularly for those most impacted by the pandemic.

- Long road to recovery – challenges to the efficacy and take up of the vaccine mean that society and the economy need to deal with the effects of the pandemic for a prolonged period. The 2020s will see sluggish economic growth and low improvements in life expectancy.

- Healthcare decline – subsequent waves proving more deadly than those already experienced. Mortality rates remain elevated for much of the 2020s with a prolonged recession after the recent recovery. Healthcare systems struggle to provide regular care.

For a typical fund, the liability impacts of these scenarios range from around a 2% increase to a 5.5% reduction. This range increases to a 3% increase to a 6% decrease for a fund with a less affluent mix of lives.
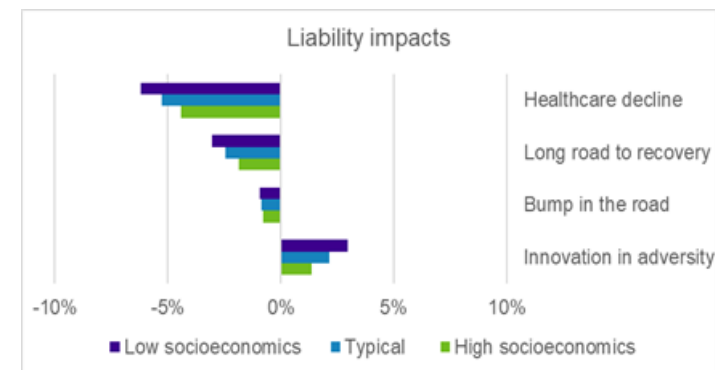
Appendix 4 – Fund specific demographic analysis

Withdrawal

We have analysed the Fund's data on withdrawals for males and females, and also split by part-time and full-time workers (historically we have observed higher withdrawal rates for part time workers), and compared the Fund's incidence rates against our 2022 national default assumption. The results of the withdrawal analysis are shown below along with our suggested scaling (no scaling is needed for full time females):

Commentary on results

The analysis shows that the shape and scale of the decrement is broadly appropriate for each sub-group when scaling is applied.

Recommendation

Update the national assumption following the Fund specific analysis. Our recommendation is to apply scaling of 80% for full-time males, 80% part-time females and 75% for part-time males. We propose that no scaling is required for full-time females.

Death before retirement

We have compared the actual numbers of deaths in the Fund's data, against the national default assumption for the 2022 valuations. This has been done for both males and females. The results are shown in the charts below.

Death before retirement - Males
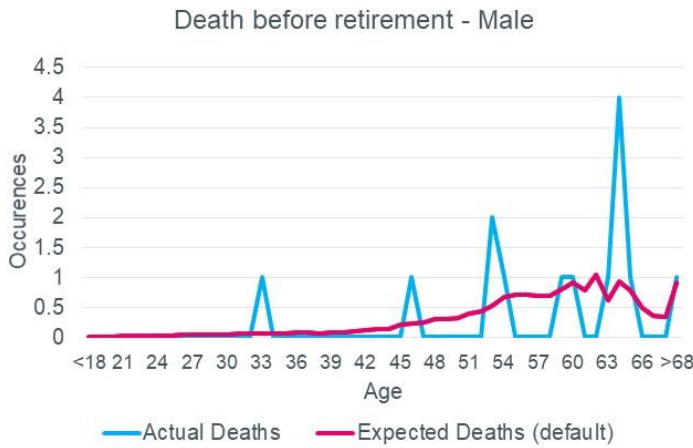
Age Band	Actual	Expected
Up to Age 20	0	0
21-25	0	0
26-30	0	0
31-35	1	0
36-40	0	0
41-45	0	1
46-50	1	1
51-55	3	3
56-60	2	4
61-65	6	4
over 65	1	2

Death before retirement - Females
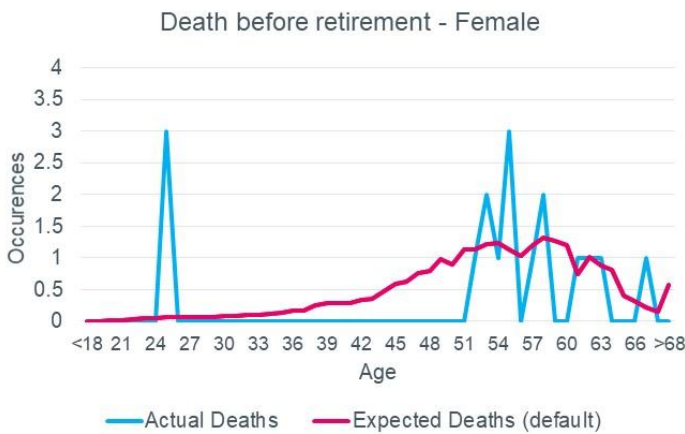
Age Band	Actual	Expected
Up to Age 20	0	0
21-25	3	0
26-30	0	0
31-35	0	1
36-40	0	1
41-45	0	2
46-50	0	4
51-55	7	6
56-60	3	6
61-65	3	4
over 65	1	1

Commentary on results

The analysis indicated no obvious departure from the shape of the 2022 default assumption and given the very low numbers we do not believe there is sufficient justification to make any change from the default assumption.

Recommendation

Make no adjustment to the default assumption.

Promotional salary Scale

At each valuation we include an underlying salary scale for active members. This salary scale reflects the promotional element of salary increases, and is in addition to the inflationary element of salary increases we apply via the salary increase assumption. The salary scale varies by age, typically with larger increases at younger ages (as you would expect more career progression, and therefore pay rises, at earlier stages in a career).

It is always difficult to measure salary scale explicitly as pay increases are rarely explicitly split between inflationary and promotional. The salary data we receive is simply a snapshot of the FTE salary at two valuation dates. The analysis has been done by taking salaries from 2016 and 2019 for active members appearing at both valuations. The average salary increase over the 3 years has been stripped out to reflect the Government's policy of awarding 1% p.a. pay awards to public sector workers in 2016/17, 2017/18 and subsequently increasing this to around 2% in 2018/19. Any residual salary increases are attributed to the salary scale.

The charts for males and females are shown below:

Commentary on results

Any salary increases are inclusive of both traditional annual inflationary increases and any underlying salary scale which reflects experience in a role.

The analysis indicates that the overall shape of the default assumption is similar to the Fund's actual experience. However, the Fund's salary increases are consistently much higher than that of the default assumption.

From discussions with the Fund, previous re-grading and job evaluation exercises may be contributing to the higher historic increases. The Fund's view is that this is not expected to continue into the longer term.

There may also be an increasing number of members working for employers (e.g. contractors) not subject to the pay awards dictated by government, who have possibly received inflationary pay awards in excess of the 1% per annum. This could narrow the gap between the actual and expected lines in the charts above.

It is worth noting that there are limitations to the analysis shown above e.g. small amounts of data at certain ages will make the results less statistically credible.

In our opinion, given the above, we do not believe there is sufficient evidence to deviate from the default assumption.

Recommendation

Make no adjustment to the default assumption.

Ill Health – Tier 1

The charts below show the expected (based on our national default assumption) and recorded number of ill health tier 1 early retirements, categorised by male and female. Alongside each chart there is a table providing groupings in age bands of 5 years, due to the low number of incidences at individual ages.

Ill health Tier 1
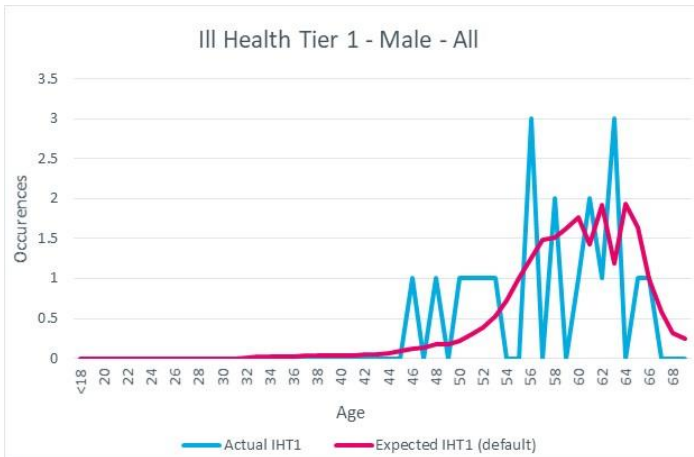
Age Band	Actual	Expected
Up to Age 20	0	0
21-25	0	0
26-30	0	0
31-35	0	0
36-40	0	0
41-45	0	0
46-50	3	1
51-55	3	3
56-60	6	8
61-65	7	8
over 65	1	2
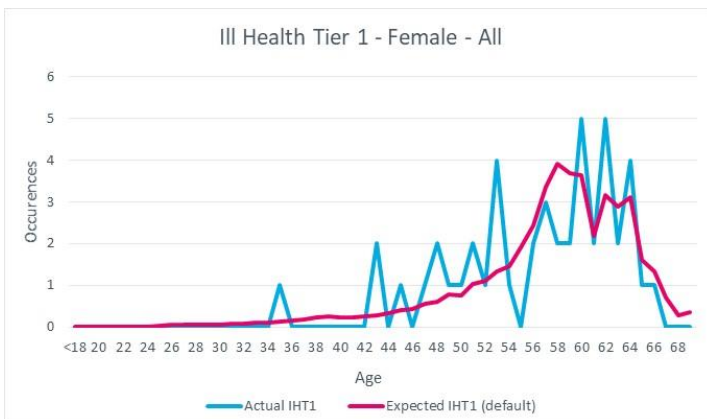
Age Band	Actual	Expected
Up to Age 20	0	0
21-25	0	0
26-30	0	0
31-35	1	0
36-40	0	1
41-45	3	2
46-50	5	3
51-55	8	7
56-60	14	17
61-65	14	13
over 65	1	3

Commentary on results

The experience analysis of the Fund's data suggests that overall the default assumption looks to be an appropriate shape and scale for the Fund's membership data.

Recommendation

Make no adjustment to the default assumption.

Ill Health Tier 2

Based on the Fund's data, there have been only 4 tier 2 ill health retirements between 2016 and 2019. This is broadly consistent with our LGPS analysis which showed there have been significantly fewer tier 2 ill health retirements than tier 1. Given the number of ill health tier 2 retirements, and the very low expected incidence, this does not provide a big enough data set to justify a departure from our default assumption.

Recommendation

Make no adjustment to the default assumption.

Data used for demographic analysis

The analysis of the Fund's experience is based on the membership data provided for the 2019 valuation, which is summarised in the 2019 valuation report dated March 2020.

As far as we can determine the data quality is adequate for the purposes of the analysis presented here. Any material issues in the data could lead to an inappropriate demographic assumption and therefore a large experience gain/loss at future valuations. However, the impact of this is not expected to be material given the size of the adjustments we have recommended to our default parameters, and the fact that demographic assumptions tend not to have a huge impact on the results anyway.