



eNews from GAD

Supporting effective decision-making and robust reporting

Issue 31, April 2018



Welcome to eNews – GAD's regular newsletter. Early this year GAD actuaries presented at the Analytical Function conference. This annual event gathers together UK public sector analytical professionals, a community of which GAD staff are active members. Evie Calcutt summarises the event's highlights, which focussed on how collaboration between different specialisms leads to more effective support for the development of government policy.

A recent example of GAD actuaries and analysts working closely with other experts is the support we have provided to UK Government Investments which has contributed to the successful sale of a new tranche of student loans. Andrew Jinks explains how this project has broken new ground.

GAD also contributes to the reporting on a significant part of the national finances: pensions for public service employees. Brian Allan examines the recent figures from the Office for National Statistics (ONS) on UK pension provision which have captured media attention. He also considers the importance of other government figures from ONS, HM Treasury Whole of Government Accounts and the Office for Budget Responsibility in giving a more complete picture.

I hope that you enjoy this issue. As always, previous issues of eNews are available on our website www.gov.uk/gad.

MARTIN CLARKE, GOVERNMENT ACTUARY

NEWS FROM GAD

New funded pension schemes Chief Actuary

Sandra Bell has moved to lead GAD's funded pension schemes team following Ken Kneller's recent retirement. We thank Ken for his many achievements in his 20 years at GAD, and wish him a happy retirement and Sandra every success in her new role.

GAD client survey 2017-18 update

We would like to thank all our clients for the feedback they provided in completing our recent survey. The findings are being taken on board by our client teams. We will be publishing the results on our website around the end of this month.

DEVELOPMENTS

Spring Statement 2018

The Chancellor of the Exchequer, Philip Hammond, presented his [Spring Statement](#) to Parliament on 13 March 2018. The Statement gave an update on the overall health of the economy, following new [forecasts](#) from the Office for Budget Responsibility. The Chancellor did not announce tax or spending changes, but gave an update on progress since the [Autumn Budget 2017](#) and set out a [number of areas](#) on which the government will consult in the summer.

Public Service Pensions: Transitional Protection

The Employment Appeal Tribunal (EAT) published its judgement on two cases concerning age discrimination in public service pension schemes. Members of the Judicial Pension Scheme and the Firefighters' Pension Scheme had challenged the transitional protection which was granted to those closest to retirement when the public service pension schemes were reformed in 2015. Two Employment Tribunal (ET) hearings reached differing conclusions in 2017. In January, the EAT found that the provisions were discriminatory for [judges](#), whilst the ET was asked to reconsider the [firefighters'](#) case based on a correct interpretation of the law. The government is appealing the judgement.

Defined benefit (DB) pension schemes

On 19 March 2018, the Department for Work and Pensions (DWP) published its White Paper on [Protecting Defined Benefit Pension Schemes](#). GAD's [Technical Bulletin](#) summarises the government's proposals and plans for future consultation, legislation and regulatory frameworks. The Pensions Regulator has since published its [Annual Funding Statement](#) for DB pension scheme valuations, setting out what it expects from trustees and employers.

Projections of mortality improvements

The actuarial profession's Continuous Mortality Investigation (CMI) has released its latest annual update of its [CMI Mortality Projections Model](#). CMI_2017 is a widely used model of mortality improvements; the reductions in mortality rates from year to year. It provides a framework for mortality assumptions. Users can input their own assessment about the long term rate of improvement. This update reflects the continuing lower-than-expected mortality improvements observed in recent population data. A [briefing note](#) provides further background and analysis.

HMRC: Scottish income tax – pensions tax

This HM Revenue & Customs [newsletter](#) provides information on the operation of pensions tax relief. New Scottish Income Tax rates and bands took effect in April 2018. The Scottish Government has also published a [press release](#) setting out how the income tax reforms will benefit the lowest earning taxpayers.

REPORT FROM THE ANALYTICAL FUNCTION CONFERENCE

The Analytical Function conference was held in London on 31st January 2018 with the theme of cross-government working and collaboration of analytical specialists in the UK public sector, with a focus on developing the Analytical Function Strategy.

The event brought together senior analysts from across the public sector and showcased examples of analysts achieving greater impact through collaboration, including a presentation from GAD.



Evie Calcutt

The 'Analytical Function' includes professional analysts, statisticians, economists, scientists, engineers and actuaries from across government and its arm's length bodies. Together they have a broad range of valuable technical expertise, and embedded across government have an important role supporting evidence-based policy and decision making. The conference was an opportunity for discussion and knowledge sharing between these senior analysts. It highlighted that analysts across specialities face a lot of the same challenges, such as how to communicate uncertainty clearly. Actuaries have experience in this area and can share learning.

Some Analytical Function member organisations:



Cross-government collaboration examples

The morning sessions showcased how analysts are achieving impact through cross profession collaboration with presentations from:

- A cross-government [Trial Advice Panel](#) on how they are bringing experts together from academia and government (Cabinet Office, Department for Transport and the HM Courts and Tribunal Service) to advise on interventions and experimental design.
- The Open Innovation Team at Cabinet Office on their role to help the public sector better collaborate with academics and [PhD projects](#) on high profile policy issues.
- UK Statistics Authority on the importance of the [Code of Practice](#) to everyone in the analytical function.
- The Government Office for Science on how publishing [Areas of Research Interest](#) documents, detailing the main research questions facing departments, aids engagement.

- The Data Science Campus at the Office for National Statistics on how they are training analysts in the latest techniques.
- GAD actuaries Anna Edwards and myself on the use of financial risk analysis to support developing countries in making informed decisions about climate risk management. This included our 2016 [climate change research project](#) and our current work with the Department for International Development and the World Bank in the area of [disaster risk financing](#).

What skills can actuaries usefully share with others?

All analytical professions share similar issues and challenges when it comes to clear communication and communicating uncertainty and variability. The GAD presentation showed our approach to these challenges. Audience feedback highlighted that actuaries at GAD are particularly skilled in this respect enabling us to better connect and build understanding with colleagues.

The actuarial profession focuses on the importance of communication as one of the key skills of an actuary. This is initially addressed by the communication elements of the actuarial exam program and further developed as part of the requirement for continuing professional development. GAD itself runs internal training on communication and other soft skills to develop its actuaries. The Analytical Function Board will want to consider how to best capture the skills of different functions and facilitate shared learning.

Analytical Function Strategy

The afternoon sessions focused on the Analytical Function Strategy, with break-out sessions providing opportunities for attendees to contribute suggestions on how to improve and develop the strategy further.

The day was very positive and thought provoking and left lots to consider as GAD looks to further embed itself across government departments and learn from other analysts, as well as using its own actuaries' and analysts' experience and skills to help.

EXPLORING THE ONS “FULLER PICTURE” OF PENSIONS

In March 2018 the Office for National Statistics (ONS) published an article on its [estimates of the pension entitlements built up in the UK](#). The £7.6 trillion total, including £1.3 trillion in respect of public service pension schemes provided by the UK government, were widely referenced in UK news media. However, what insights into the financing of pensions for public servants do these figures give? Can other available statistics give a more complete picture?



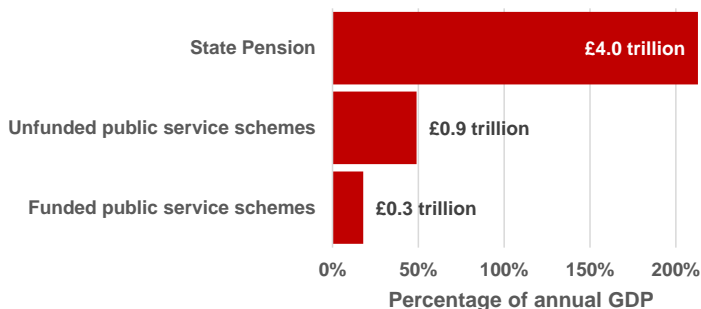
Brian Allan

Pensions built up in the UK

The ONS estimates of entitlements built up by households as at the end of 2015 are broadly split into pensions provided by the UK government via the State Pension (£4.0 trillion) and schemes for public servants (£1.3 trillion), and those provided by private sector workplace schemes (£2.3 trillion). The private and public amounts are not easy to compare due to differences in the ways they are assessed.

There is, however, more consistency between the figures for government-provided pension entitlements. The graph below shows these as both monetary amounts and percentages of gross domestic product (GDP).

UK government-provided pensions at 2015



These amounts measure the entitlements as the total of projected future benefit payments (for pensions built up by 2015) [discounted at a real interest rate](#) of 3% (5% nominal) a year. These are gross liabilities; the value of funded scheme assets has not been deducted.

What are the insights for public service pensions?

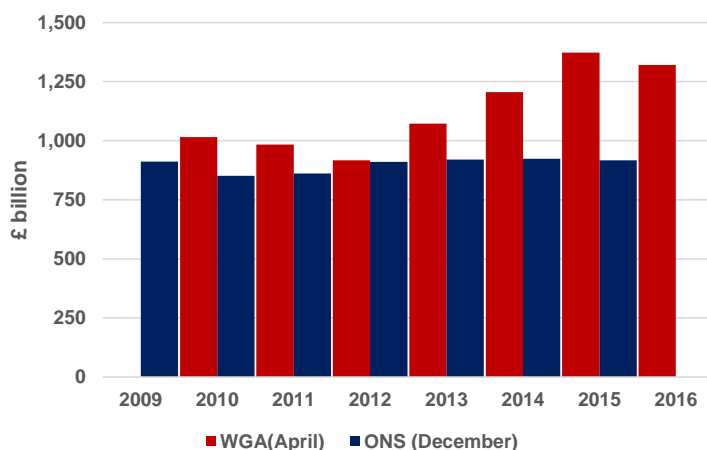
These figures provide a point in time picture of the liabilities of public service pension schemes in the context of the scale of the State Pension and other occupational pensions. Regular aggregated figures for public (and private) schemes have only been available more recently. ONS first published a table of UK pensions in April 2012 (for entitlements as at 2010). HM Treasury released the first Whole of Government Accounts (WGA) for 2009/10 in Nov 2011, which provides aggregate public service scheme liabilities as part of the consolidated UK public sector accounts.

Looking at figures for previous years shows the progression of the size of the liabilities. As the 3% real discount rate used by ONS has been stable since ONS first compiled these figures, trends affecting benefits are clearly visible. (This rate is set to be consistent with that used in other EU governments' national statistics.)

In contrast year-on-year changes for the WGA liabilities' are dominated by changes in the discount rate which, in line with international accounting standards, is set to reflect yields on corporate bonds. The WGA showed liabilities of £1.3 trillion as at April 2016; 44% higher than the December 2015 ONS figure for broadly the same unfunded public schemes. The main reason for this is the lower real discount rate of 1.37% used in the WGA.

The impact is large as the entitlements are expected to result in substantial benefit payments decades in the future. The discount rate difference is compounded many times leading to very different liability values.

Unfunded public service pension liabilities



(ONS, figures for 2013 onwards are provisional.)

ONS data for unfunded scheme liabilities in the graph above shows a drop in liabilities in 2010 primarily due to the move to increase most benefits in line with the consumer prices index (CPI) rather than the retail prices index (RPI), a £97 billion reduction. The step up in 2012 in part reflects the creation of the Royal Mail Statutory Pension Scheme prior to the Royal Mail's privatisation.

EXPLORING THE ONS “FULLER PICTURE” OF PENSIONS (cont.)

What do the liability values not show?

The ONS and WGA pension liabilities figures illustrate the scale of public service pension rights built up in the UK. However in isolation these do not show:

- The rate at which these pension entitlements are building up
- The affordability of the benefit payments in the future
- The degree to which actual payments could vary from the projections

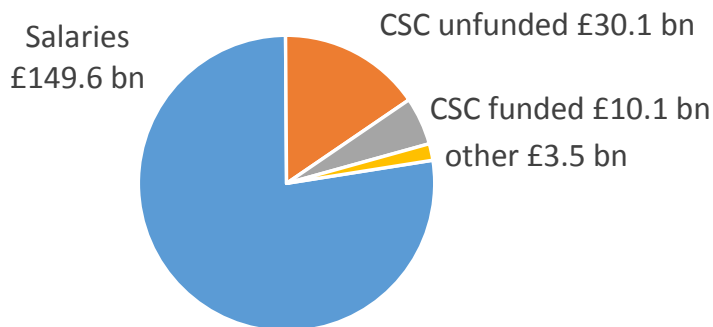
So liabilities are only a part of the picture of the significance of pensions in national finances.

What other information is available?

Rate of accumulation

The annual cost of public service pensions accumulating is examined within the WGA. The current service cost (CSC) measures this in terms of the future payments expected as a result of the service of employees over the year. (These are discounted to the date of the WGA at the same rate used to calculate the liability values.)

2015-16 WGA: Staff costs

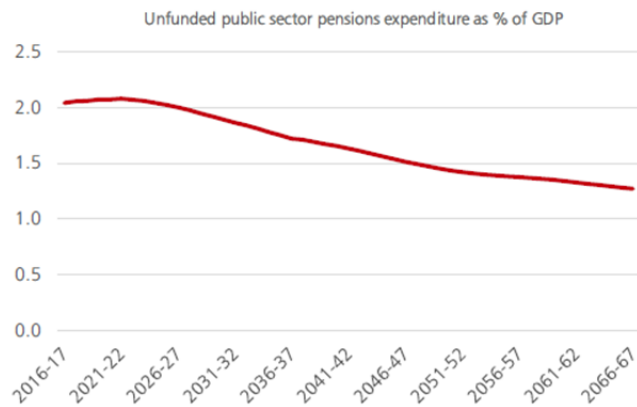


CSC figures have employees’ contributions deducted, Salaries include temporary and contract staff who are not scheme members

Both the CSC and the liability figures collapse all of the expectations about future outcomes on which they are based into a single figure. These figures are supported by analyses of changes from the previous assessment, which support comparisons between assessments or schemes. However, the pattern of long term payments is less obvious.

Long term affordability

The projection of public service pension expenditure as a percentage of GDP published in the regular Office for Budget Responsibility (OBR) fiscal sustainability reports provides a clearer picture of long term affordability. As it covers benefit payments from both accrued and future service, it is a fairly comprehensive illustration of future costs. This chart from the January 2017 report shows expenditure falling from just over 2% to under 1.5% of GDP by 2050.



This downward trend in cost reflects the savings from switching from RPI to CPI benefit increases, increases to member contributions and the reform of public service schemes away from final salary to career average benefits with generally later normal retirement ages, among other factors.

Assessing risks ... and opportunities

The apparent improvement in affordability above is also contingent on the underlying projection of GDP. This and other quantities incorporated in these figures such as future improvements in life expectancy are highly uncertain. Central estimates alone don't represent this.

Together with an understanding of what risks could affect outcomes, a range of approaches can provide an even better picture. The WGA provides sensitivities to its pension liability figures: the change that would result if different assumptions were used to give readers a picture of the potential for variance. This is also a routine component of the annual statements GAD produces which are aggregated into the WGA. The ONS article shows such analysis for discount rates.

Another technique is to consider alternative scenarios around the main projection. The ONS adopts this approach in the national population projections for example. This approach easily accommodates exploration of the possible impact of future planned or proposed changes (as in the case of the 2012 OBR fiscal sustainability report projections of pension expenditure for elements of public sector pension scheme reform).

Conclusion

The ONS figures provide a valuable aggregation of results. They put UK pensions including public service pensions in the context of the national accounts and allow international comparison. They are not intended to act as a complete basis for appraising affordability.

Other analyses prepared by a range of UK public analytical professionals including OBR, HM Treasury, and GAD provide information that can be used to assess affordability and uncertainty.

A NEW FINANCIAL ASSET CLASS IN THE UK

In December last year, the government finalised the sale of some student debt to private investors. The sale was the first of its kind and created a new financial asset class in the UK. Valuing and selling these unique assets presented demanding problems which were addressed by drawing in experience from a range of experts from both the public and private sectors. This article looks at some of the main challenges and how GAD was able to provide support to these elements of preparing for the sale.



Andrew Jinks

Why was this sale the first of its kind?

The UK Government has sold student loans before. However these were older 'mortgage style' loans available to students between 1990/91 and 1997/98. With different repayment terms, this first sale of Income Contingent Repayment (ICR) loans represented a unique challenge and has introduced a new asset class in the UK.



The loans sold were pre-2012, Plan 1 loans held by approximately 411,000 students who first entered repayment between 2002 and 2006. Through the sale, future repayment proceeds from the loans will be passed to private investors, in exchange for an upfront payment to the government.

The sale raised around £1.7 billion for UK government and is expected to be the first in a series of sales of the Plan 1 loan book which is targeting £12 billion proceeds.

What are Income Contingent Repayment loans?

Whilst loans have been offered to students going to university or higher education for many years, the introduction of tuition fees in 1998 coincided with a significant change in the student loan terms. In particular:

- loans now cover both tuition fees and maintenance; and
- repayments depend on a borrower's earnings and only start once these earnings reach a certain threshold level.

These loans are called 'Income Contingent Repayment' loans.

What was the government's approach?

In the 2016 Autumn Statement, Chancellor Phillip Hammond reiterated the government's intention to launch a sale of the ICR English Plan 1 student loan book. This required significant planning, analysis and organisation across a number of stakeholders, government departments and advisors.

The sale was structured as a securitisation, meaning that the loans were packaged together and their related cash flows sold to investors as bonds with varying seniority, maturity and interest rates. A key requirement was being able to straightforwardly project and understand those future cash flows expected. [UK Government Investments \(UKGI\)](#), the Government's centre of excellence in corporate finance and governance who are overseeing the sale of the Plan 1 loans on behalf of DfE, asked GAD to develop a computer model to deliver this and inform the sale.

A key requirement ... was having an appropriate model in place to project and understand the cash flows expected.

Who used the model and what does it do?

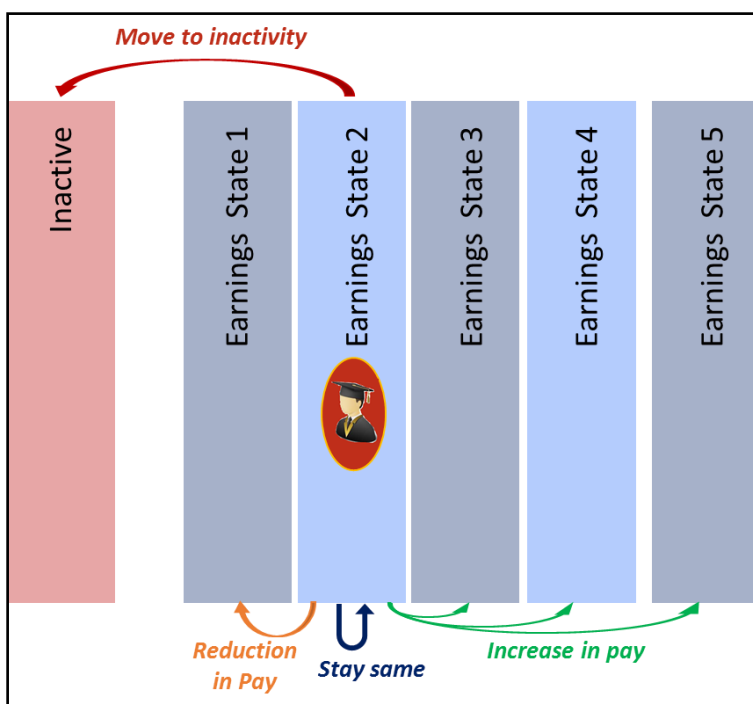
The model was needed by government to better understand and place a value on the cash flows of a particular pool of loans that would be sold to investors, and inform decision making. However, given that investors and other market participants, such as investment rating agencies, were not familiar with this new type of asset, the model was also provided to third parties. This allowed them to increase their understanding of the key characteristics of the loan cash flows and analyse possible outcomes using their own views.

The model provides a projection of the repayments for the group of student loans included in the sale. Projecting cash flows under the sale was done in a number of stages:

- First each borrower's earnings are projected year by year;
- Next, the earnings are converted into repayments, based on each loan's terms and amount outstanding;
- Finally, the payments to investors are determined from the total projected collections and the package loan structure.

GAD's focus was the first part: projection of earnings.

A NEW FINANCIAL ASSET CLASS IN THE UK (cont.)



Projecting borrowers' earnings

GAD's model projects a borrower's earnings as a journey through a number of 'states', which broadly represent different levels of earnings and also periods of economic inactivity. The key assumptions in the model are the probabilities dictating if and when borrowers move between the different states. They depend mainly on the borrower's current earnings.

Working in partnership

Developing a suitable model for the pool of loans to be sold proved challenging for both the private and public sector due to the unique nature of the asset. UKGI ultimately selected GAD's model due to the accuracy of the model output and the simplicity of the modelling approach.

the successful delivery of the model depended critically on building a close working partnership with UKGI

Given the need both to share the model with third parties and to meet the challenging sale timescales, the GAD model needed to be quickly developed to meet a high quality hurdle. Whilst the GAD team worked with dedication and efficiency, the successful delivery of the model depended critically on building a close working partnership with UKGI via:

- on-site working and regular dialogue – managing the project and discussing initial findings;
- developing the model in an agile manner – allowing us to share, discuss and refine the approach and evolve the model as quickly as possible; and
- open engagement and regular challenge meetings – taking stock on progress and testing our approach and assumptions.

GAD gave ongoing support and advice to UKGI throughout the sale process on the appropriate use of the model and the significance of the assumptions and judgements on which it is built. Further GAD assisted UKGI in assessing the "value for money" of the sale.

GAD's working partnership with UKGI has evolved and strengthened through this support and through secondments of GAD staff to UKGI. Secondments at both junior analyst and senior modelling team lead levels have helped embed the model within UKGI and transfer knowledge – as well as providing development opportunities for staff at both organisations.

Next steps

This is expected to be the first in a series of sales of the Plan 1 loan book targeting £12bn proceeds. GAD's focus is now switching to supporting UKGI on future sales and how the model developed between UKGI and GAD might be used in the future.

The successful delivery of this project demonstrates how GAD can apply our skills as actuaries to work closely with other experts to support robust decisions on novel and unique problems. Further, the project demonstrates ways of working to minimise development time and increase our understanding of how the analysis supports the rest of the project.

If you would like further information on how GAD's expertise and skills can support you – particularly on developing models and analysis to support unique and novel challenges – please contact **Andrew Jinks** or **Ian Rogers**.

GAD contacts

Email: enquiries@gad.gov.uk Telephone: 020 7211 2601

For details of our management team and office address please visit:

<https://www.gov.uk/gad#people>

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