Government Actuary's Department

Police pension schemes (England and Wales)

Actuarial valuation as at 31 March 2012

Report on methodology

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Contents

1 Introduction

1.1 This report is addressed to the Home Office. It should not be reproduced or disseminated to other parties without prior consent. The Government Actuary's Department (GAD) does not accept any liability to third parties, whether or not it has agreed to the disclosure.

1.2 The purpose of this report is to summarise the methodologies adopted for certain aspects of the valuation calculations. It also explains why the approaches taken are necessary and the impact of the approaches taken on the valuation results.

1.3 The data and assumptions to be used for the valuation are the subject of separate reports.

1.4 The contents of this note have been discussed with the Home Office who has confirmed that it is content that the methodology is appropriate for use in the 2012 valuation.

2 Active membership projections

2.1 The Directions[1] require the actuary to calculate the cost of benefits accruing over the periods 1 April 2012 to 31 March 2015 and 1 April 2015 to 31 March 2019.

2.2 In addition to the assumptions used, the main factors affecting the expected cost of the benefits are:

(i) the scheme benefits being accrued by members; and
(ii) the profile of the active membership over these periods.

2.3 The former is particularly important due to the changes being introduced on 1 April 2015 as a result of the reform of the Police Pension Scheme (PPS) and the New Police Pension Scheme (NPPS), referred to collectively in this report as the Police pension schemes ("the Schemes"). The expected cost of the benefits provided to members remaining in the existing final salary schemes differs from the expected cost of providing those members with benefits in the 2015 career average scheme. Further, the expected cost of providing benefits also varies for members in the PPS and NPPS.

2.4 The Directions therefore implicitly require the actuary to determine the expected active membership up to 31 March 2019 in order to determine the valuation results. However, for a practical application of the methodology we have focussed on the membership of the Schemes as at 31 March 2015, 1 April 2015[2], 31 March 2017[3] and 31 March 2019.

Approach to determining the active membership of the Schemes as at 31 March 2015, 31 March 2017 and 31 March 2019

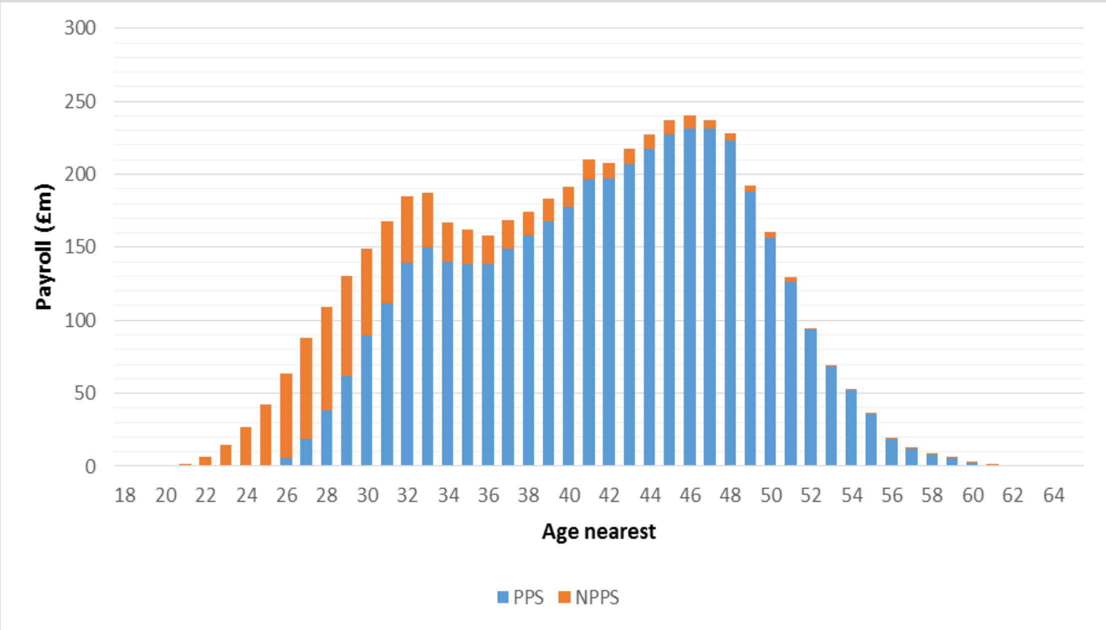
2.5 Detailed data on the active membership is held as at 31 March 2012. There are two main alternative approaches which could be used to determine the active membership at future dates:

(i) Assume the active population remains relatively stable by total salary roll at each age. Appropriate adjustments would be made to allow for the transfer of members to the 2015 scheme.
(ii) Project forward the 31 March 2012 data and allow for expected changes in the workforce at future dates.

[1] *The Public Service Pensions (Valuations and Employer Cost Cap) Directions 2014* issued by HM Treasury
[2] The active membership will essentially be the same on both 31 March 2015 and 1 April 2015. The difference is that unprotected members will transfer across to the 2015 scheme on 1 April 2015. For the purposes of this report, any reference to data as at 31 March 2015 also applies to the data as at 1 April 2015.
[3] The requirement for data at 31 March 2017 is discussed in paragraph 3.3 of this report.

2.6 Chart 2.1 below shows the profile of the active membership as at 31 March 2012 by age and salary roll.

Chart 2.1: 2012 active membership profile by age and salary roll



2.7 The chart shows there are peaks at various ages which are expected to move over time as these members get older. As such, it is not appropriate to assume that the active membership will remain stable by age and salary roll over the period 1 April 2012 to 31 March 2019. Also, the expected reduction in the membership over 2012-15 is likely to lead to lower recruitment and so reduce the proportion of the membership at the younger ages.

2.8 The active membership therefore needs to be projected to 31 March 2015, 2017 and 2019 in order to determine the active membership at these dates. This requires three components:

- Determine the expected total payroll of the active membership as at 31 March 2015, 31 March 2017 and 31 March 2019
- Project the 2012 active membership to 31 March 2015, 31 March 2017 and 31 March 2019
- Add in expected new joiners over the periods 2012-2015, 2015-17 and 2017-2019.

Total salary roll as at 31 March 2015, 31 March 2017 and 31 March 2019

2.9 The Home Office submitted forecasted income and expenditure information to the OBR for use in their work on the Autumn Statement 2013. This information was the aggregate of the forces' own projections, which are based on their own expectations of future workforce size and future general pay increases specified by the Home Office. The assumed pay increases were not in line with those set out under Direction 17. Table 2.1 below shows the general pay awards assumed for each projection year in the OBR forecasts and, for comparison, in Direction 17.

Table 2.1: Pay awards used in OBR forecasts

Year ending	**OBR forecast**	**Direction 17**
31 March 2013	0.0%	1.8%
31 March 2014	1.0%	0.5%
31 March 2015	0.0%	1.5%
31 March 2016	0.0%	2.0%
31 March 2017	3.0%	2.5%
31 March 2018	3.0%	3.0%
31 March 2019	3.0%	3.0%

2.10 To ensure that changes to the real salary roll (ie after removing the impact of pay awards under Direction 17) only reflect the forces' expected changes to the workforce, the total salary roll in the OBR forecasts has been adjusted so that pay awards are in line with Direction 17 rather than those underlying the original forecasts. These revised forecasts have been used as the expected total payroll as at 31 March 2015, 31 March 2017 and 31 March 2019. These figures are shown below, along with the total payroll at 31 March 2012 from the valuation data for comparison.

Table 2.2: Expected total actual payroll of the Schemes

	Total payroll[3] (original)	**Total payroll[3] (adjusted)**
31 March 2012	£4.97bn	£4.97bn
31 March 2015	£4.71bn	£4.85bn
31 March 2017	£4.95bn	£5.17bn
31 March 2019	£5.25bn	£5.48bn

Projecting the active membership data to 31 March 2015, 31 March 2017 and 31 March 2019

2.11 Not all of the active membership at 31 March 2012 will still be in active service as at 31 March 2015, 31 March 2017 or 31 March 2019. We have projected the 31 March 2012 membership forward assuming members leave in line with the valuation assumptions adopted for normal health retirements, ill-health retirements, withdrawals, deaths in service and promotional salary increases.[4] These assumptions were set based on recent experience in the Schemes and therefore represent the best estimate of future movements within the Schemes.

New joiners to the Schemes

2.12 In order to achieve total payroll figures at 31 March 2015, 31 March 2017 and 31 March 2019 consistent with the amounts in Table 2.2 above, we need an assumption about the profile of new entrants to the scheme.

2.13 We have assumed that the profile of new entrants (in terms of age and gender and pay) is consistent with the profile of recent entrants to the Schemes (based on the data provided for the 2012 valuation for members with short service). Specifically, we have assumed that the members as at 31 March 2015 who have entered the scheme since 31 March 2012 have the same profile as members in 2012 with less than three years' service. Similarly, the profile of entrants between 2015-2017 and 2017-19 is based on the membership in 2012 with less than two years' service. The average age of these groups is about 28 at entry.

2.14 We have added the appropriate proportion of the subset of the 2012 membership to the projection of the existing membership to match the total projected payroll in 2015. New entrants are assumed to join the NPPS over this period.

2.15 The projected membership in 2017 is determined in a similar way, with the assumed 2015 membership projected in line with valuation assumptions and new entrants added in to match the overall payroll. New entrants are assumed to join the 2015 scheme over this period. Similarly, the 2019 membership is derived from the assumed 2017 membership.

[4] Allowance for general salary increases is in line with Direction 17.

Summary of the scheme membership as at 31 March 2015, 31 March 2017 and 31 March 2019

2.16 We have determined the expected membership of the scheme as at 31 March 2015, 31 March 2017 and 31 March 2019 in line with the method set out above.

2.17 The tables below summarise the active membership data at these dates, showing the proportions of payroll and the average age in each section of the Scheme at the relevant dates.

Table 2.3: Projected proportion of payroll

Section	31 March 2012	31 March 2015	1 April 2015	31 March 2017	31 March 2019
PPS	84%	79%	46%	33%	21%
NPPS	16%	21%	2%	1%	1%
2015 scheme	0%	0%	52%	65%	78%

Table 2.4: Average age* of projected membership

Section	31 March 2012	31 March 2015	1 April 2015	31 March 2017	31 March 2019
PPS	42.0	43.7	48.2	49.9	51.6
NPPS	31.7	33.8	48.3	50.9	53.3
2015 scheme			35.7	36.9	38.3

* weighted by salary

2.18 As eligibility for transitional protection in the PPS depends on age and/or service at 1 April 2012, on average protected members in the PPS are slightly younger than protected members in the NPPS.

2.19 The distribution of the membership by age and salary roll at each relevant date is shown in the charts below. The projection does not directly model membership numbers.

Chart 2.2: 31 March 2012 membership profile by age and salary roll

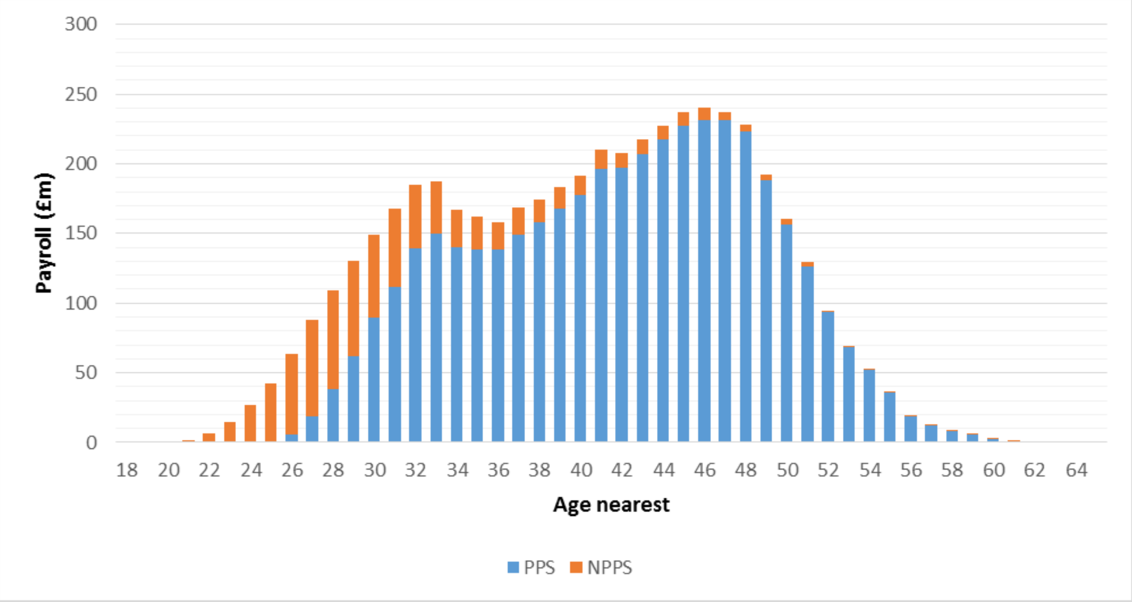


Chart 2.3: 31 March 2015 membership profile by age and salary roll

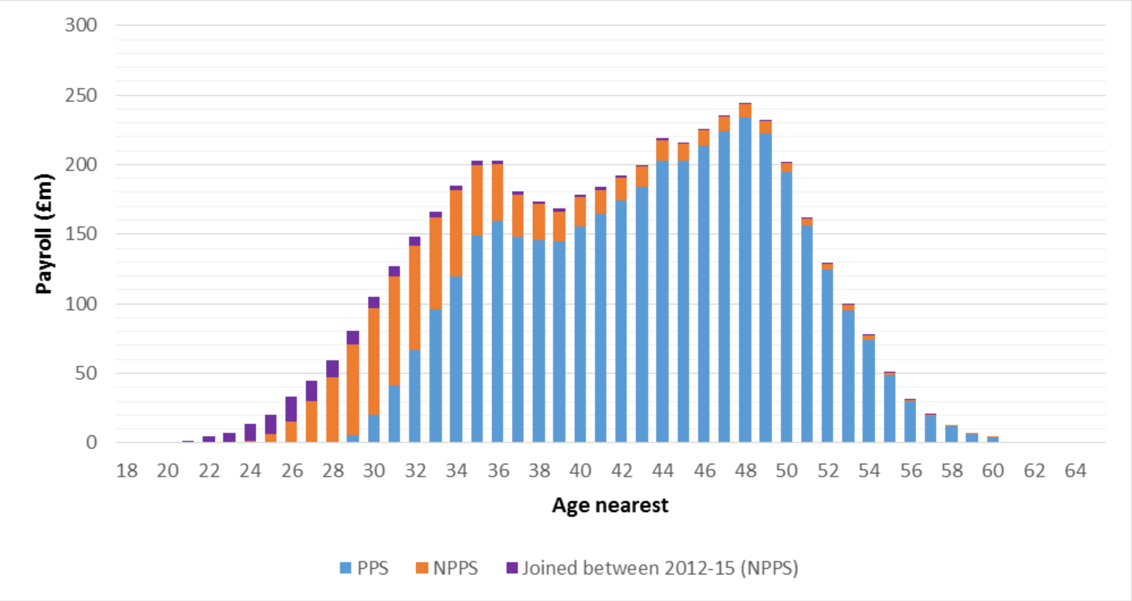


Chart 2.4: 1 April 2015 membership profile by age and salary roll

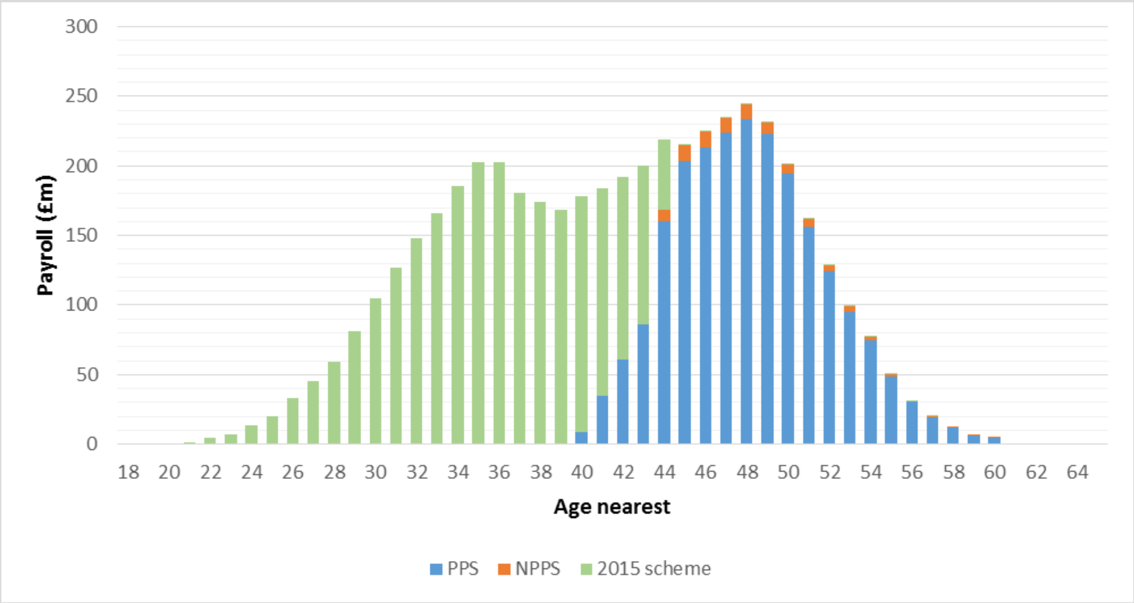


Chart 2.5: 31 March 2017 membership profile by age and salary roll

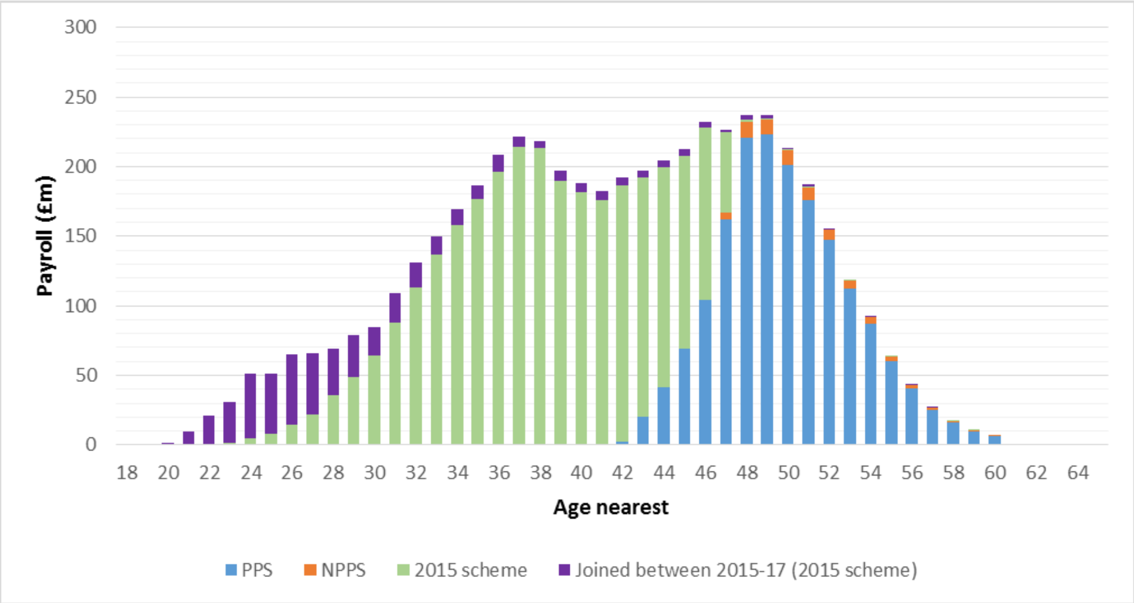
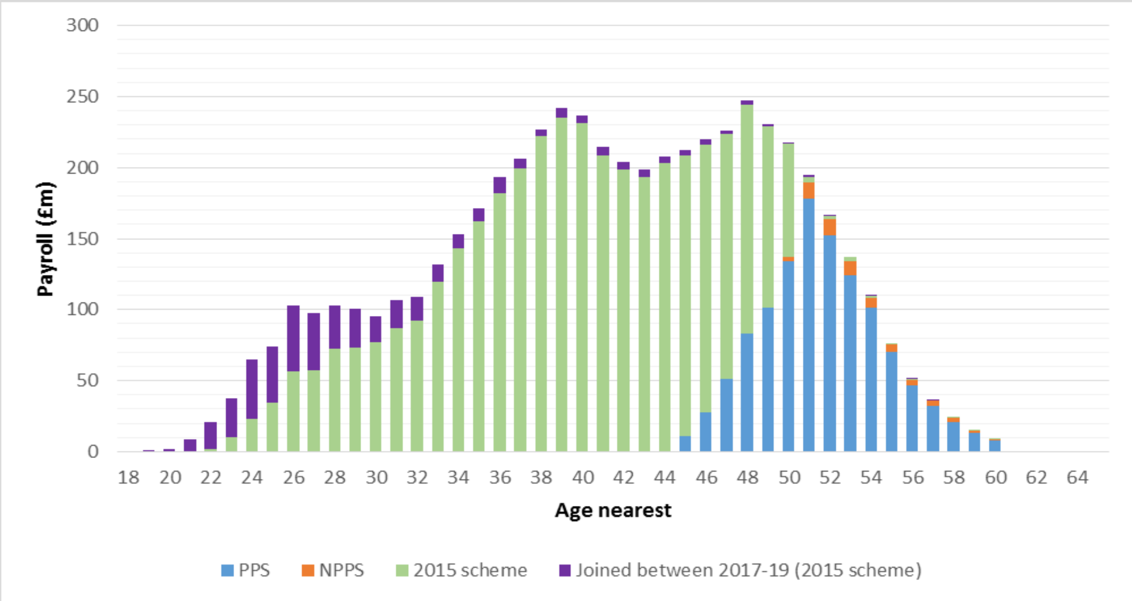


Chart 2.6: 31 March 2019 membership profile by age and salary roll



Projecting the membership beyond 31 March 2019

2.20 After 31 March 2019, the total salary roll is assumed to increase in line with the general earnings increase under Direction 17. The salary roll up to 31 March 2030 is required to determine deficit contributions payable under Directions 27(1)(a) and (c).

Membership projections for the employer cost cap

2.21 The same membership projections are used for the cost of accrual over 2015-19 (Direction 27(1)(d)) and the proposed employer cost cap (Direction 53).

3 Accrual cost methodology

3.1 Individual active members have been grouped together for the purposes of calculating liabilities. This grouping is necessary to accommodate the volume of data within our valuation system. The membership is grouped by gender, age (to nearest birthday), service (to nearest whole year) and scheme (PPS, NPPS or 2015 scheme).

3.2 Direction 11 requires use of the projected unit methodology to determine the valuation results.

3.3 When determining the costs of accrual as required by Directions 27(1)(b), 27(1)(d) and 53(1), the general approach is first to determine the cost at the start and end of the relevant period based on the (projected) membership of the sections of the scheme and the applicable assumptions at those times. The overall cost of accrual for the period is then determined as the average of the costs at the start and end, weighted by the expected present value of the payroll at these times. This approach should be reasonable provided that changes to the membership are spread out across the period. This may not be the case for the Police schemes over 2015-19. In particular, the tapered group may not reduce steadily and there may not be steady levels of recruitment over this period. We have therefore split the period by considering 2015-2017 and 2017-19 separately.

3.4 Directions 14, 16 and 17 specify some modifications to the financial assumptions in the short term. An implication of the short term modifications is that the projected unit methodology is expected to result in an increasing standard contribution rate over successive periods. For example, the cost of accrual under the existing scheme is lower in 2012 than in 2015 (for a similar group of members). This effect is not immaterial for final salary benefits but has no effect on the cost cap calculation since short term assumptions are explicitly disregarded for this purpose in Direction 53.

3.5 The cost of double accrual for later periods of service in the 1987 scheme has been spread uniformly from joining the scheme up to the point of exit, or 30 years' service if earlier.

3.6 The cost of accrual for officers in the 2015 scheme has been determined using their salary at the time of accrual with revaluation to retirement (rather than the average revalued salary over all service).

3.7 Non-accruing benefits such as lump sums payable on death in service or enhancements payable on ill-health retirement or death in service are recognised only at the time of retirement or death.

4 Approximations and miscellaneous items

Guaranteed Minimum Pensions (GMPs)

4.1 The scheme is not liable for the full indexation of GMPs and so makes savings on GMPs compared to the cost of providing a fully indexed pension. In general, individual GMP data could not be supplied for members where the GMP was not in payment and so the savings have been estimated in an approximate manner.

4.2 The approximation is based on the ratio of GMP to other pension for pensioners who are old enough for GMP to be in payment. This provides an indication of the total GMP that will have been accrued in the Schemes. The approximation is intended to be unbiased but its accuracy will be affected by changes in scheme size and earnings profile over the period of GMP accrual (1978-1997).

4.3 The total estimated savings are under 1% of total liabilities and allowance for this serves to reduce the deficit contributions (assessed as being required for 15 years from 2015) by about 1% of pay, compared with valuing all benefits as fully indexed pensions. All of the savings have been attributed to pensioner members because the clear majority of GMP will have been accrued by officers who have now retired.

4.4 Much more complete data is expected to be available at the next valuation. Any difference between the estimated savings and a more accurate assessment using more complete data will feed into the surplus or deficit at that valuation and impact upon the employer contribution rate then determined in relation to addressing the surplus or deficit.

4.5 The estimation of GMP savings has no impact on the calculation of the cost cap. Provided accurate GMP data is available as at 31 March 2015, the approximation will not apply to the starting value of the cost cap fund and so will not impact on the operation of the cost cap mechanism.

Earnings cap

4.6 The earnings cap only applies in limited circumstances in the PPS. No allowance has been made for its impact as this would not be material to the valuation results. There is no earnings cap for members of the NPPS, and this will also be the case for the 2015 scheme.

Public Service Transfer Club (PSTC)

4.7 Costs arise on final salary PSTC transfers because the transfer value is usually less than the cost of providing the service credit granted. Most PSTC transfers over 2015-19 will be transfers of final salary benefits. Allowance has been made for the potential costs of these transfers by assuming that the level of transfers continues at recent levels and the cost of providing the service credit is about twice the transfer value received. Overall, the additional costs are equivalent to about 0.5% of pay. HMT has confirmed that these costs also apply to the calculation of the cost cap.

4.8 In the longer term, PSTC transfers will increasingly be transfers of career average benefits. The exact form of these transfers and distribution of the costs involved has yet to be determined. However, it is likely that PSTC costs to the Schemes will fall over time.

Expenses

4.9 No allowance has been made for expenses. Expenses are met from outside the scheme's valuation framework.

General pay increases

4.10 Pay increases are assumed to occur on 1 September each year in accordance with Direction 17, eg an increase of 1.8% on 1 September 2012.

Final pensionable pay

4.11 We have assumed that officers' average pensionable pay is their pay in the final year of service.

Promotional pay awards

4.12 No allowance has been made for the impact of any freeze on promotional/progression salary increases.

Dependants' pensions

4.13 No allowance has been made for short term dependant pensions or children's pensions (other than those already in payment), on grounds of materiality.

State Pension Age

4.14 An officer's Deferred Pension Age in the 2015 scheme is set equal to their State Pension Age (SPA). Direction 18 sets out the SPA to use for an officer in the valuation calculations. Increases in SPA are not instantaneous. For example, someone born on 5 April 1960 has an SPA of 66 years, someone born on 5 October 1960 has an SPA of 66 years and 6 months, and someone born on 5 April 1961 has an SPA of 67.

4.15 For the purposes of the valuation calculations we have taken a pragmatic approach to calculate each member's SPA. Using the example above, anyone born between 5 April 1960 and 30 September1960 is assumed to have an SPA of 66, and anyone born between 1 October 1960 and 5 April 1961 is assumed to have an SPA of 67. The same approach has been adopted for the transition between other SPAs. This approach will not have a material impact on the valuation results.

Early retirement in 2015 scheme

4.16 Officers who retire aged between 55 and 60 will have their 2015 scheme pension actuarially reduced to allow for early payment before normal retirement age. The pension is reduced so the capitalised value of future payments from retirement are equal to the value of the unreduced pension deferred until age 60. We have modelled these reductions using factors that might be expected to apply at retirement.

4.17 There is no option to retire from active service with actuarially reduced benefits in the PPS or NPPS.

Deferred members above NPA

4.18 We have assumed that all deferred members will claim their benefits. This includes former officers who are now older than their deferred pension age. If these members never claim their benefits a slight surplus will emerge in the notional fund over time. Overall, if these members were excluded, the past service liability would reduce by around £23 million and the contribution rate by less than 0.1%. There would be no impact on the employer cost cap.

Added Years

4.19 In certain limited circumstances officers can purchase additional service. The added years data supplied to GAD could not be easily associated with the main pension data for officers who had purchased this option. As such, added years were modelled separately and included in the active members' past service liability. These have been modelled in the same manner as other active members' benefits, except that we have assumed that all added years benefits are paid to members at age 55. The past service liability at 31 March 2012 in respect of added years is around £6 million and so this simplified approach to retirement timing will not have a material impact on the valuation results.

Appendix A: Record of changes since 8 July 2014 draft

A.1 This advice was issued in draft on 8 July 2014. The table below records the changes made since that draft.

Reference	**Change**
3.5, 3.6, 4.12, 4.14, 4.15	Drafting changes to incorporate further details on methodology agreed with HO and HMT as part of provisional assessment of contribution rates for Budget 2014.